FOOD MANUFACTURE

Incorporating Food Industries Weekly

...RD HILL LIMITED, STRATFORD HOUSE, 9 EDEN STREET, LONDON, N.W.1 JUNE 1, 1954

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GRAVIES ETC

IN THE FOOD TRADE

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Dry-Mixed goods, wheatmeal and speciality flours	Powder & Powder (Mocha)
Soft drinks	S.D.
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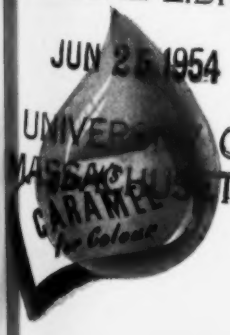

Department Food Technology
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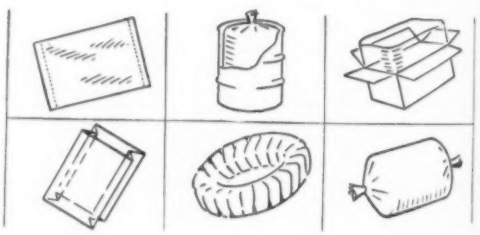
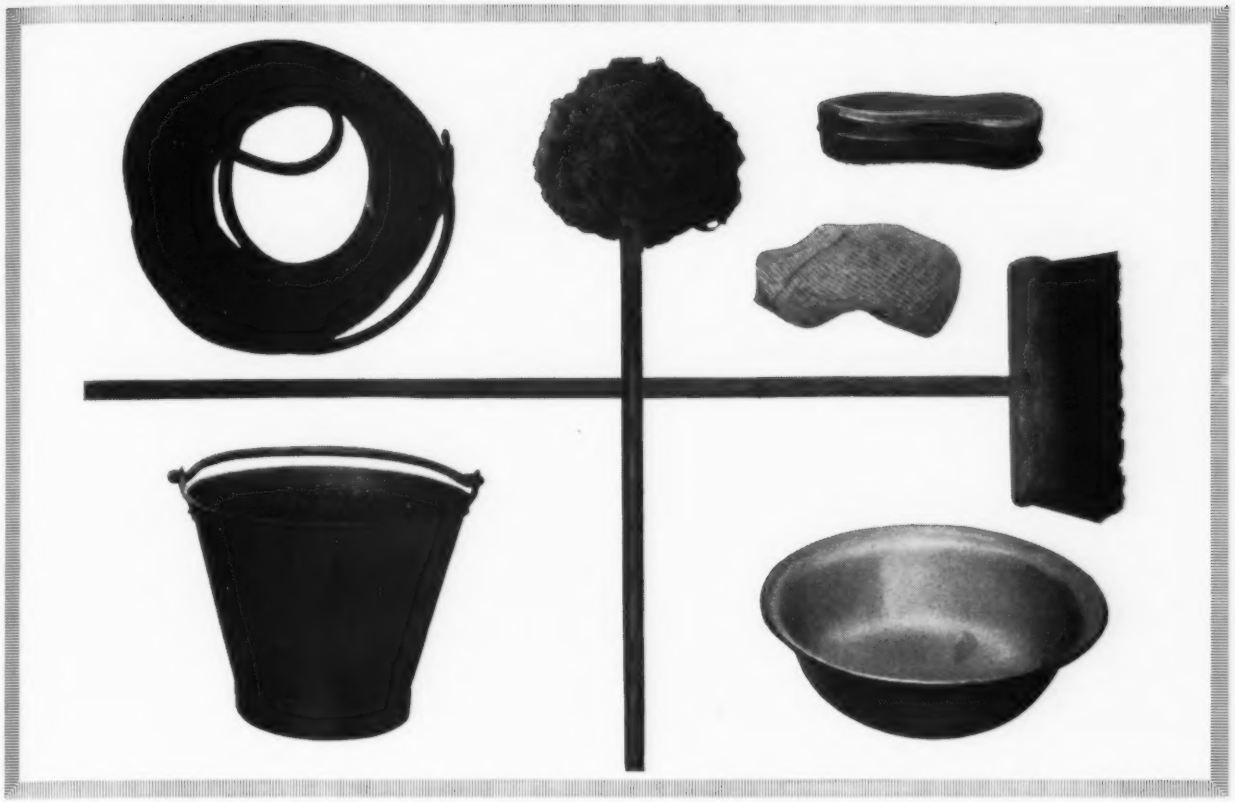


* *Write for descriptive leaflet and samples*

"Fablothene" layflat Polythene Tube

ANGLO-AMERICAN PLASTICS LIMITED. 1 AVERY ROW. GROSVENOR STREET. LONDON. W1 · HYDE PARK 9261

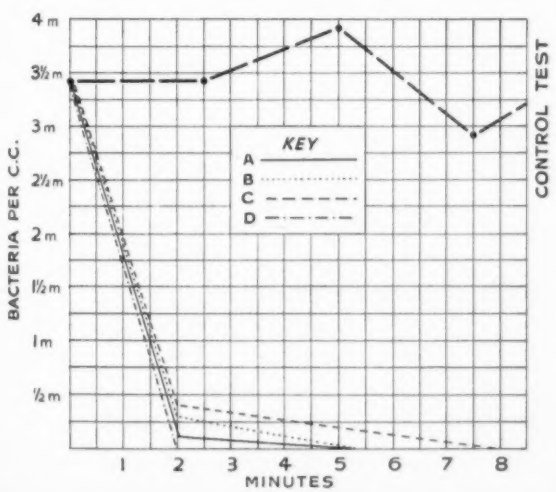


Which one of these do you use?

It doesn't really matter as long as you are using Marinol-D; scrubbing, rinsing, soaking or spraying, the detergency and germicidal potency of Marinol-D will give the highest possible standard of cleanliness, both visually and microscopic.

Practical experience, following laboratory trials, has shown that complete sterility can be obtained when equipment, utensils, tools and work areas are washed with Marinol-D. In a few minutes virtually all heavy contamination of micro-organisms can be completely eliminated; even with an excess of organic solids present, such as dried milk, egg, fats, peptone and glucose, the remarkable powers of Marinol-D are exerted to their full extent.

The graph and table, giving results under practical conditions, diagrammatically illustrates the degree of safety and freedom from germs that can result from using Marinol-D when examined in the presence of dirty water, such as is found in the dish-washing tanks of industrial canteens.



ORGANISM		Viable Organisms per Ml. After		
		2½ mins.	5 mins.	7½ mins.
Escherichia Coli	(A)	20	Nil	Nil
Staphylococcus Aureus	(B)	70	Nil	Nil
Proteus Mirabilis	(C)	1,200	900	50
Penicillium Expansum Spores	(D)	Nil	Nil	Nil
Control Test (Without Adding Marinol-D)		3,480,000	3,960,000	2,900,000

Temperature – 50°C. to 45°C. pH of Solution – 8.5

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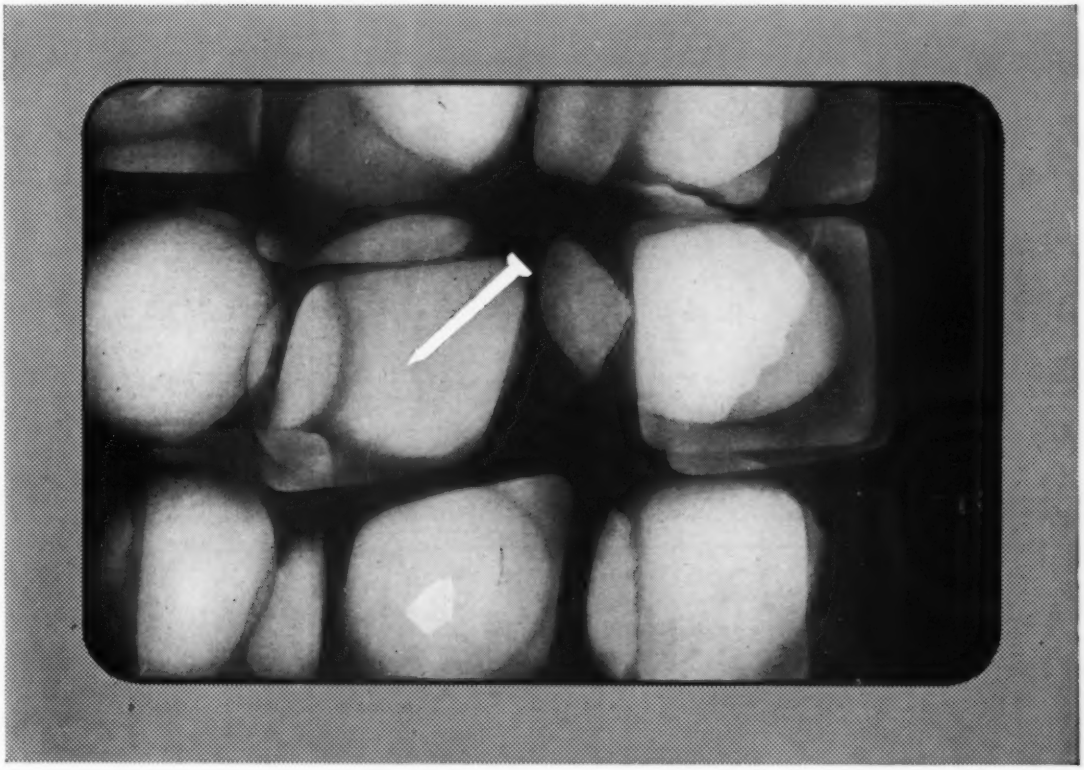

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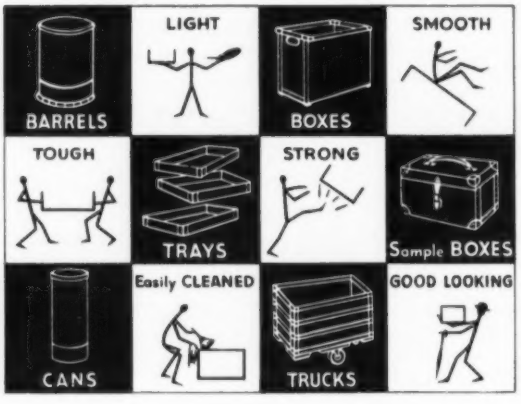

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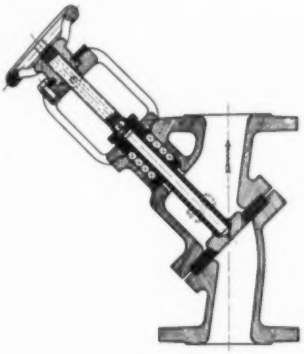

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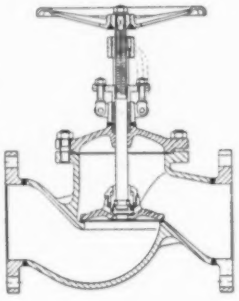

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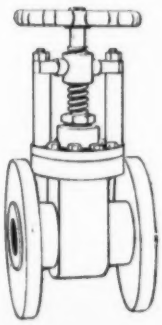

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The Jones-Mitchell Hydro process pea and bean line from the seamer and filler end.

Absence of moving parts and compact design contribute to the space and labour saving features of the Jones-Mitchell Hydro-System Process Pea and Bean Canning Equipment. Its handling is efficient and hygienic and the finished product has an attractive appearance.

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Liquid process control by **MEASUREMENT**

1½" S 7. stainless steel meter with screw on flanges and 12" vertical index.

When you require to measure bulk or batch quantities of edible liquids, oils, spirits and solvents, hot or cold water, we can supply meters with summating, resettable, electrical presettable, direct reading or pointer type index attachments (as illustrated) and control equipment.

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INDUSTRIAL **LIQUID** *METERS*

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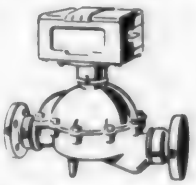
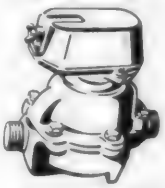
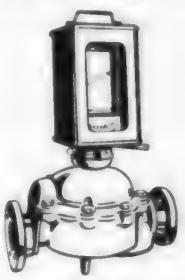


BOX TYPE COUNTER
Re-settable batch-dispensing counter with 7-digit cumulative total register.

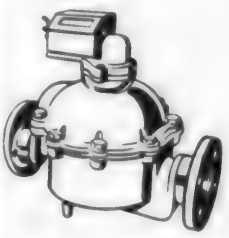
6" VERTICAL RE-SETTING INDEX
Can also be used to pre-set a determined quantity, with electric trip to operate solenoids pumps, warnings, etc.



ZEROSET INDEX
Simple turning motion re-sets indicator to zero.



MECHANICAL RECORDER
Gives a graphic record on 5" x 12" chart; suitable for 4 hour, 8 hour, 1 day, 7 day periods



PREDEX CONTROLLER
Automatic means for continuous dispensing of fixed quantities of liquids.

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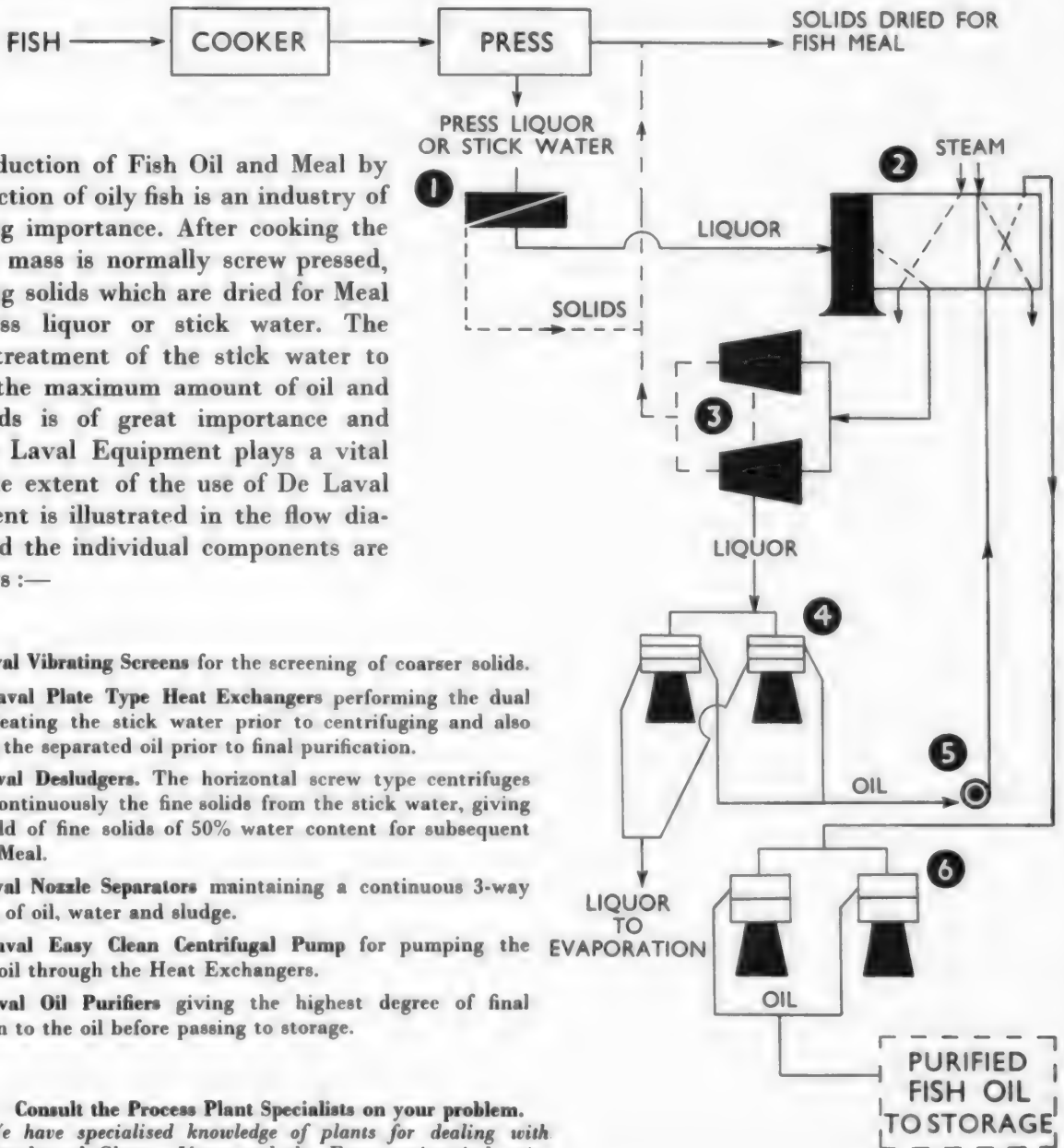
DE LAVAL EQUIPMENT

in the FISH OIL & MEAL INDUSTRY



The production of Fish Oil and Meal by the reduction of oily fish is an industry of increasing importance. After cooking the fish, the mass is normally screw pressed, producing solids which are dried for Meal and press liquor or stick water. The correct treatment of the stick water to recover the maximum amount of oil and fine solids is of great importance and here De Laval Equipment plays a vital part. The extent of the use of De Laval Equipment is illustrated in the flow diagram and the individual components are as follows :—

1. **De Laval Vibrating Screens** for the screening of coarser solids.
2. **Alfa-Laval Plate Type Heat Exchangers** performing the dual duty of heating the stick water prior to centrifuging and also re-heating the separated oil prior to final purification.
3. **De Laval Desludgers.** The horizontal screw type centrifuges separate continuously the fine solids from the stick water, giving a high yield of fine solids of 50% water content for subsequent drying to Meal.
4. **De Laval Nozzle Separators** maintaining a continuous 3-way separation of oil, water and sludge.
5. **Alfa-Laval Easy Clean Centrifugal Pump** for pumping the separated oil through the Heat Exchangers.
6. **De Laval Oil Purifiers** giving the highest degree of final purification to the oil before passing to storage.

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We have specialised knowledge of plants for dealing with Starch and Gluten, Yeast and the Fermentation industries, Vegetable Oil, Fish Oil and Mineral Oil refining etc.

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EN-MASSE TUBULAR CONVEYOR SYSTEM

Patented throughout the world.

The secret of Fisholow-Hapman versatility. The circular flights of the Neoprene-sealed Link-Pin Chain enable the Conveyor to turn through any angle, convey any flowable material, and give years of trouble-free service.

CLEANEST DISTANCE BETWEEN TWO POINTS

The Fisholow-Hapman En-masse Tubular Conveyor System is the cleanest and most effective system ever devised for the rapid handling of all flowable materials, whether in granular, powder or semi-liquid form.

FISHOLOW

One of many Fisholow-Hapman applications—conveying flour from sifters to mixing machines.

Continuous in operation and requiring no supervision, the Fisholow-Hapman Conveyor is dust-proof, liquid-tight, odour-confining. Silently, unobtrusively, this revolutionary Conveyor collects and conveys materials in a perpetual flow without any possibility of contamination.

It can be embodied in new plant, added to existing machines, or installed as a complete system throughout the factory. Whatever the circumstances it will prove itself the cleanest and most economical means of handling flowable material.

See this Conveyor working at the Mechanical Handling Exhibition, Olympia, June 9th-19th.

Stand No. D.9. Grand Hall.

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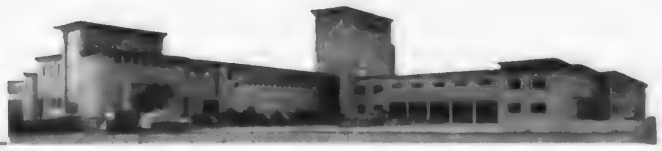
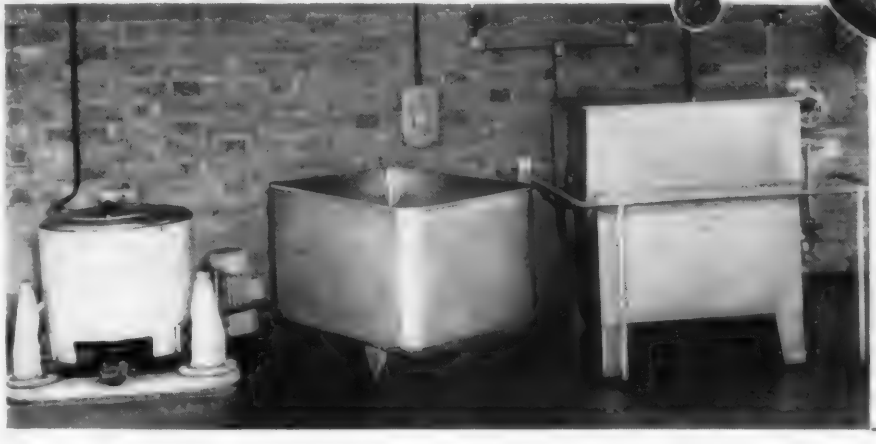


Electrolux LAUNDRY EQUIPMENT

to wash straining cloths —on the spot!

Those specialists in the production of vitamin fruit syrups, H. W. Carter of Coleford, Gloucester, have found the answer to a pressing problem. At their Royal Forest Factory they wash and sterilize a peak period weekly requirement of 700 heavy nylon straining cloths—*on the spot*—with Electrolux Laundry Equipment.

Extracting juice and tipping out remaining pulp.



Electrolux Laundry Equipment (Washing Machine, Hydro-Extractor, Laundry Truck):—

- provides a high-temperature wash — at boiling-point if necessary.
- reduces handling.
- saves delay in turn-round of work.
- reduces wear-and-tear.

(left) Installation at H. W. Carter Ltd., of Coleford, Gloucester.

Washing Machine handles 22 lb. dry weight in *one* operation. Heats its own water — by gas, electricity or steam — to correct washing temperature (180° F) or to boiling-point if required. No additional water heating plant needed.

Hydro-Extractor: capacity of 14½ lbs. dry cloth weight. Sturdily built with pendulum suspension — smooth and *quiet* in operation.

Laundry Truck: capacity 53 gallons. For soaking and transporting laundry from Washing Machine to Hydro-Extractor. Made of chrome steel with smooth interior and rounded edges and corners. Foot-operated drain cock.

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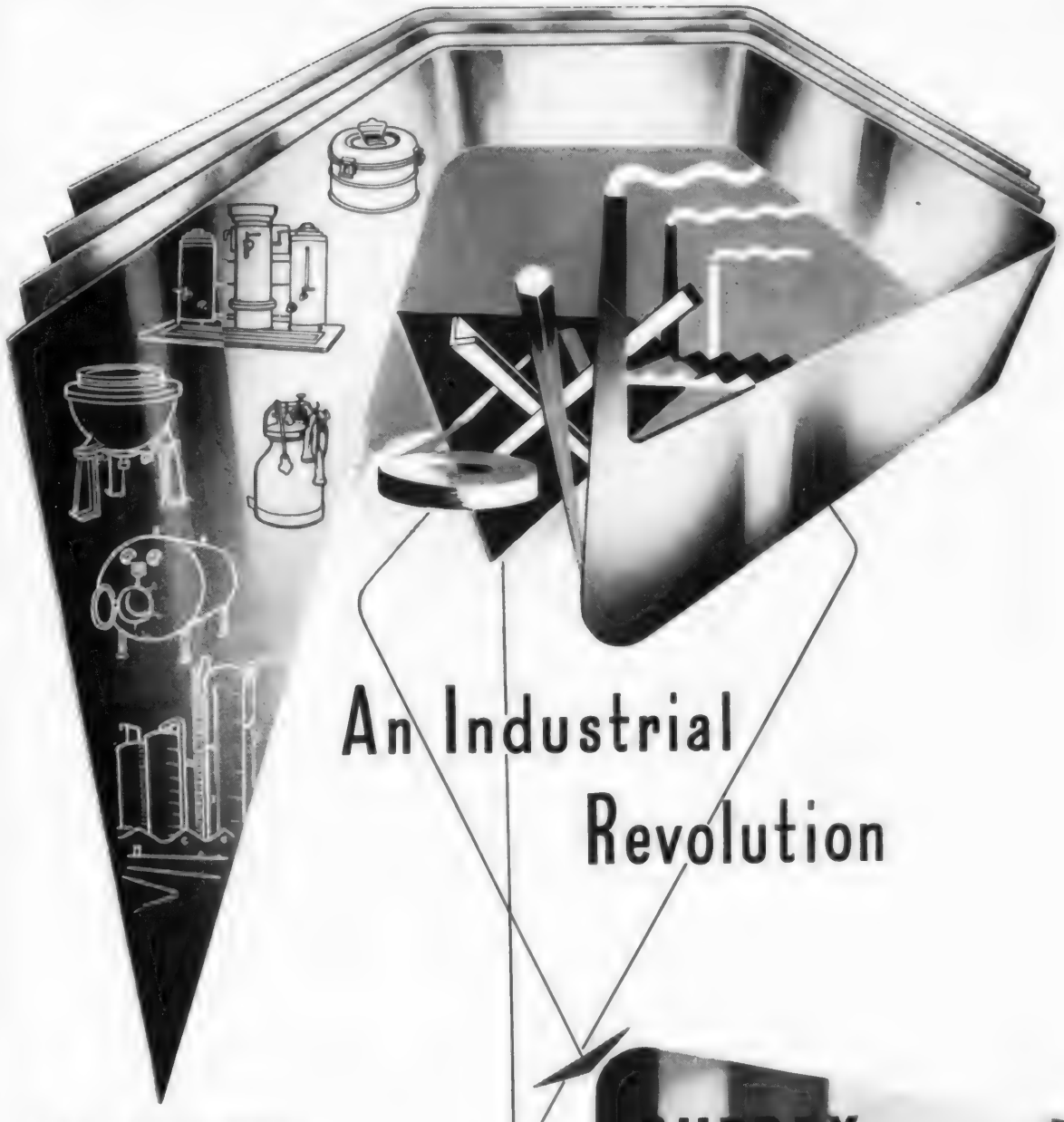

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Today, even the suspicion of dirty conditions linked to food manufacture can be sudden death to the best of reputations! And rightly so. Keeping things up to the highest standard of hygiene is probably much simpler than you know—if you have never used TEEPOL. TEEPOL is the amazingly efficient Shell detergent to tackle all your cleaning, right through from the preparation rooms to the general offices. *All* cleaning is easier, quicker, less like hard work—and much more economical—when TEEPOL is your cleaning aid.

Please write for a free illustrated booklet which describes the many uses of TEEPOL.

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The new can with the hermetic closure and perfect "re-seal"

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THE removal of packaging restrictions allows this entirely new type of can to be supplied freely for the first time—and Metal Box capacity for quantity manufacture means that it is available at an economic price. The Collar Can has advantages for both manufacturer and consumer. It gives hermetic sealing. It is opened easily with the key provided. When opened the equivalent of a neat hinged-lid gives an efficient and convenient reseal. High quality surface decoration, printed direct on to the metal, can add sales and advertising value.

The Collar Can is precision made and designed for high speed filling and closing operations. It is ideally suited for most types of powders, solids and granulated products that need a hermetic seal to preserve freshness and flavour. An ingenious can proving that in container design and production Metal Box "Know-How" does count!

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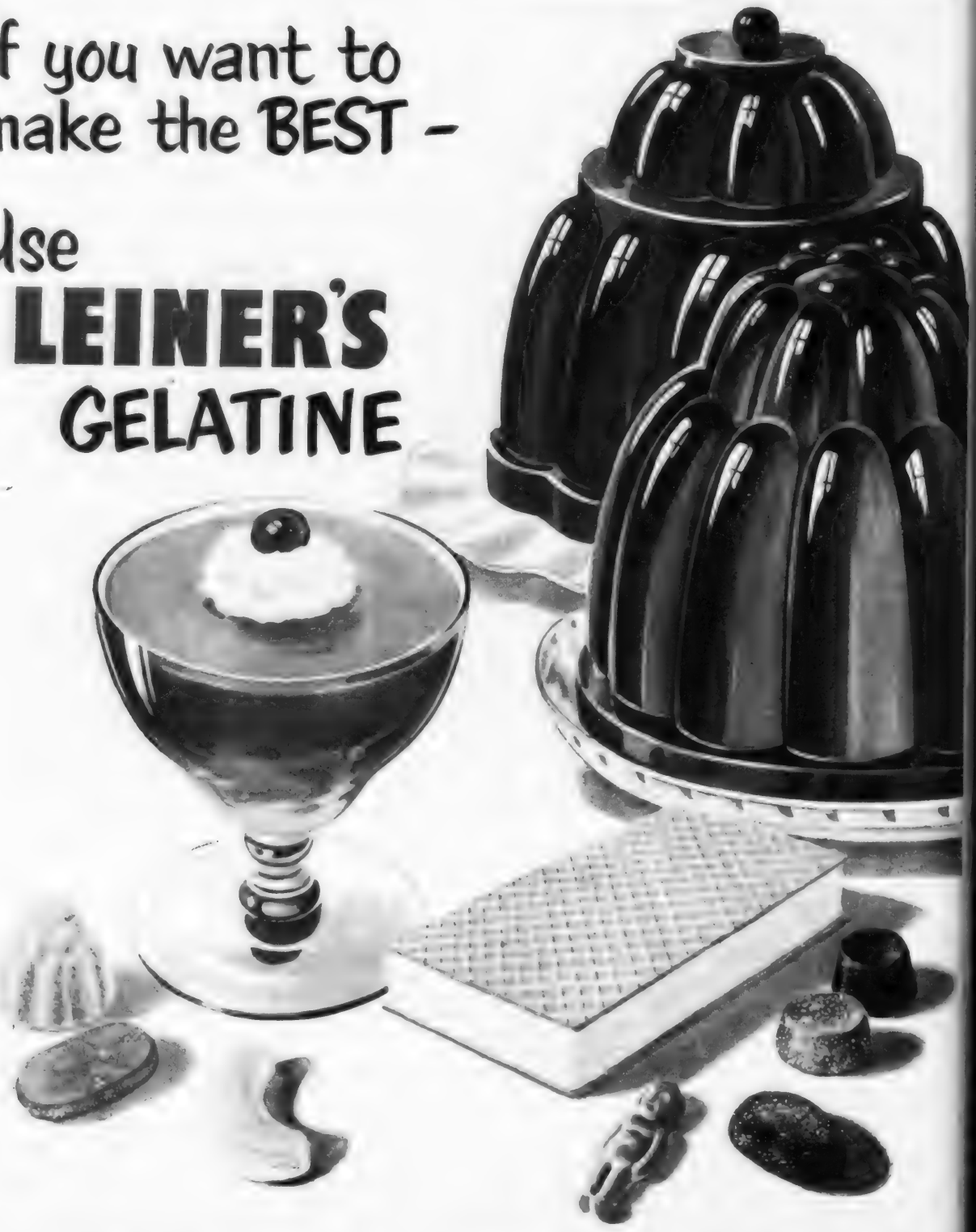

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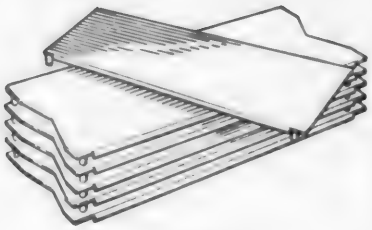
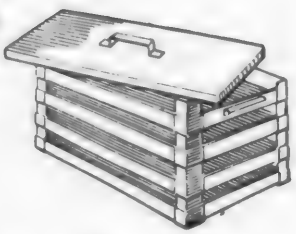
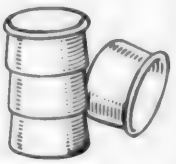
a little



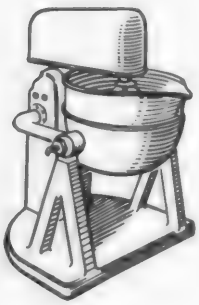
LISSAPOL

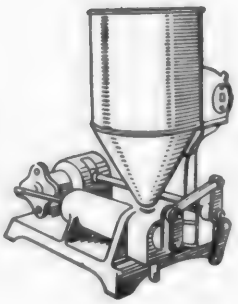
(liquid cleanser)

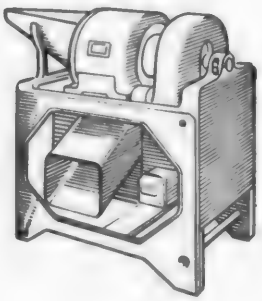




goes a long way . . .

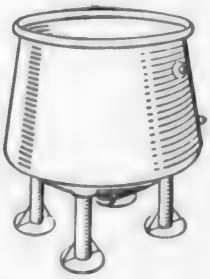






Lissapol is powerful, safe and economical for the cleaning of a wide variety of food-processing equipment.

Excellent for space cleaning, too.



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In the preparation of foodstuffs, scrupulous attention to cleanliness is essential. That is why this modern plant for the production of margarine makes extensive use of "Silver Fox" Stainless Steels for all metal parts in contact with the product. Freedom from contamination and ease of cleaning are but two of the many advantages of "Silver Fox" Stainless Steels.

The colour photograph—taken in the process room of the Stork Margarine Works—is reproduced by courtesy of Messrs. Van den Berghs and Jurgens Limited.

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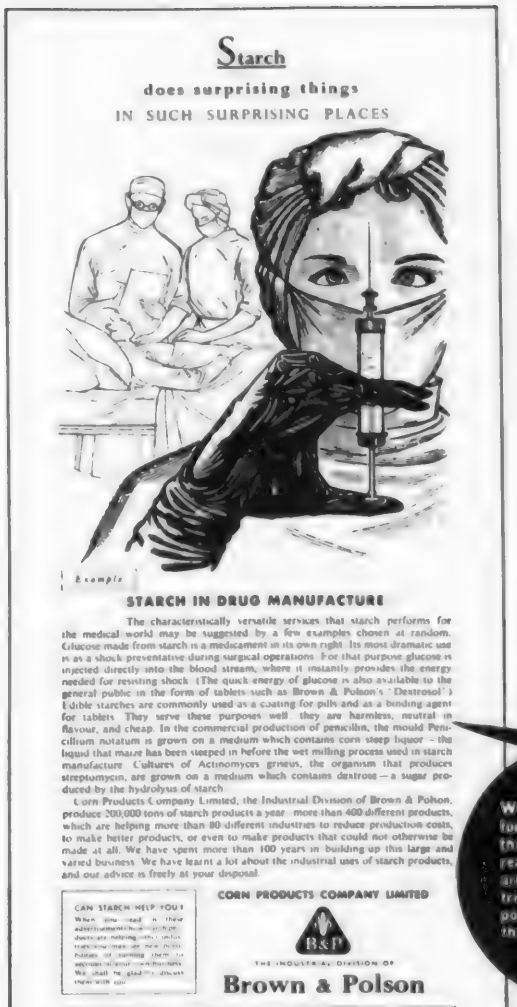
Starch
does surprising things
IN SUCH SURPRISING PLACES
Example
STARCH IN DRUG MANUFACTURE
The characteristically versatile services that starch performs for the medical world may be suggested by a few examples chosen at random. Glucose made from starch is a medicament in its own right. Its most dramatic use is as a shock-preventative during surgical operations. For that purpose glucose is injected directly into the blood stream, where it instantly provides the energy needed for resisting shock. (The quick energy of glucose is also available to the general public in the form of tablets such as Brown & Polson's 'Dextrosol'.) Edible starches are commonly used as a coating for pills and as a binding agent for tablets. They serve these purposes well: they are harmless, neutral in flavour, and cheap. In the commercial production of penicillin, the mould Penicillium notatum is grown on a medium which contains corn steep liquor – the liquid that maize has been steeped in before the wet milling process used in starch manufacture. Cultures of Actinomyces griseus, the organism that produces streptomycin, are grown on a medium which contains dextrose – a sugar produced by the hydrolysis of starch.
Corn Products Company Limited, the Industrial Division of Brown & Polson, produce 200,000 tons of starch products a year: more than 400 different products, which are helping more than 80 different industries to reduce production costs, to make better products, or even to make products that could not otherwise be made at all. We have spent more than 100 years in building up this large and varied business. We have learnt a lot about the industrial uses of starch products, and our advice is freely at your disposal.
CAN STARCH HELP YOU?
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Watch the National press for advertisements like this one. When you read how starch products are helping other industries you may see new possibilities of turning them to account in your own business.

for you, in the Preserving Industry

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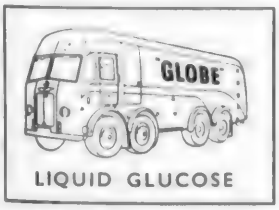
" Globe " liquid glucose is made from starch by Corn Products Company Limited—the Industrial Division of Brown & Polson—and we make the starch, too. Our careful control of every manufacturing process from the grain to the finished product is your assurance of the quality and purity you require in your preserves.



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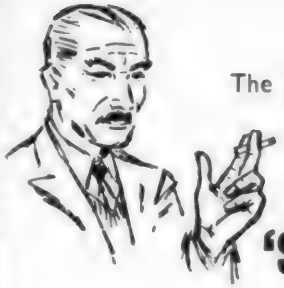

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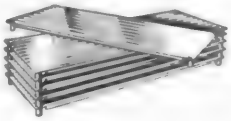
'Strong-light-clean-smooth-easy stacking WARWICK has everything'



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- ★ Available with or without base drainage holes
- ★ Larger size in 16 gauge, smaller size 18 gauge Aluminium Alloy
- ★ Lids also available, common to both sizes

Other effective depths between 3½" and 7¾" can be offered in 16 gauge or 18 gauge providing reasonable quantities are required.

WARWICK PRODUCTION COMPANY LTD

IN ASSOCIATION WITH **ALMIN LIMITED** FARNHAM ROYAL BUCKS

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FOR BETTER PROCESS PLANT OPERATION
CONSIDER THESE POSSIBILITIES

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Spirax methods improve heat transfer from steam by reducing the thickness and resistance of the stagnant films of water and air on the condensing surfaces:

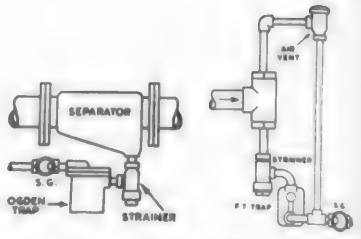
1. **By 'individual steam drying'**; *small Spirax Steam Separators at the inlets to process units to ensure good dry steam for each individual unit;*

2. **By air-free steam**; *Spirax Automatic Air Vents at the correct venting points on process units, to discharge the bulk of air on starting and whenever air collects during running;*

3. **By high-efficiency steam trapping**; *the right Spirax Trap, correctly chosen for the job and fitted in the correct position, to discharge condensate effectively under all conditions at the rate at which the job demands.*

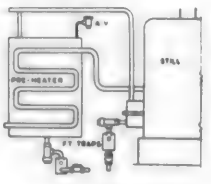
Spirax give also specialist advice on condensate recovery systems and flash steam recovery systems.

Please use the request slip.



STEAM MAINS

Spirax Steam Trapping and Air Venting for steam transmission systems, giving better steam supplies and quicker heating up.



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Spirax Steam Trapping and Air Venting for improved heat transfer in stills, brewing vessels, constant temperature heaters, etc.

TEMPERATURE CONTROL

For the majority of processes, thermostatic control in its simple direct form is adequate, sensible and inexpensive.

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2. *They utilise the great power of hydraulic expansion; this self-generated force is exerted* **directly** *upon the regulating valve;*

3. *Operating power is uniform, per degree of temperature change, over the whole temperature scale, giving the same powerful direct valve operation at refrigeration temperature as at high temperature.*

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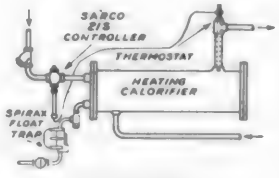

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Sarco Controllers for regulating temperature in hot-water storage and non-storage calorifiers

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Sarco Temperature Controllers give fully effective (direct-acting) operation at refrigeration temperatures.

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.....Pocket Manual 'How to fit Steam Traps'

.....Information Sheet on 'Air in Steam Spaces'

.....Bulletin 'Steam for Process'

NAME

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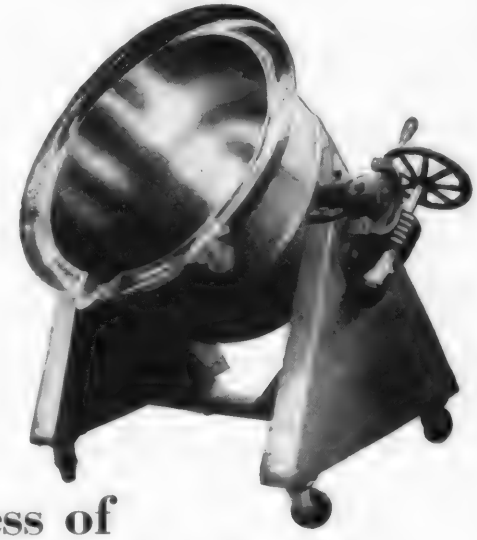
FM654

Stainless Steel for the storage and processing of Foodstuffs



Right in line with health and hygiene is the polished cleanliness of

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stainless steel equipment

Because of its inert non-corroding surface, smoothly polished and easily cleaned, stainless Steel is the ideal container for the storage and processing of foodstuffs. The items illustrated . . . a 50 gallon Tipping Pan and Jacketed Pan, both in Stainless Steel . . . are typical of much Butterfield work for the Food Industry, including Vats, Tanks, Pressure Vessels and Vacuum Vessels, Troughs, Trolleys, Mixers, Hoppers. Butterfield craftsmanship is notable for accuracy, fine finish, and careful attention to details. Also, it has the backing of large productive capacity for all types of work in Stainless Steel, Mild Steel and Aluminium.

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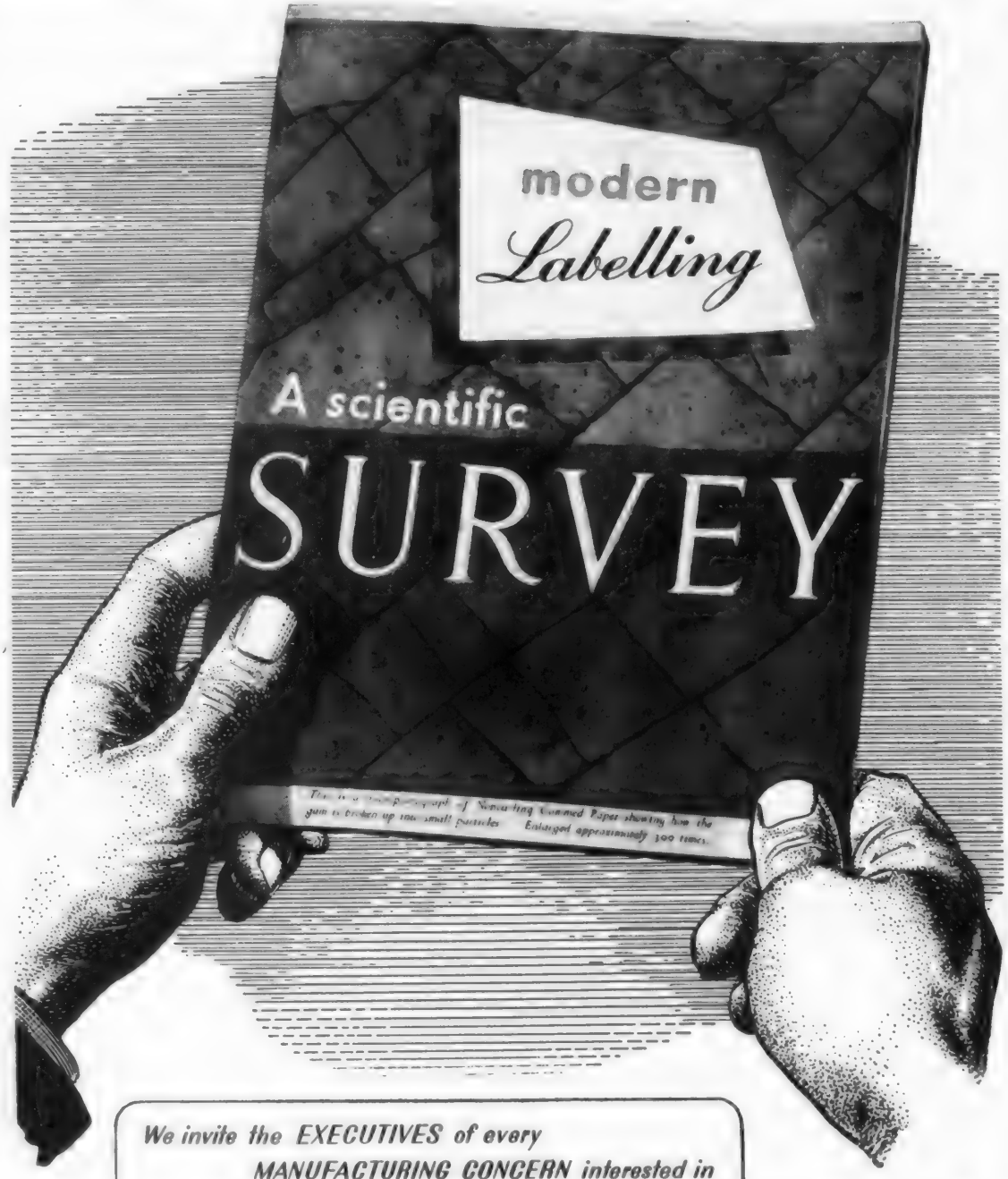

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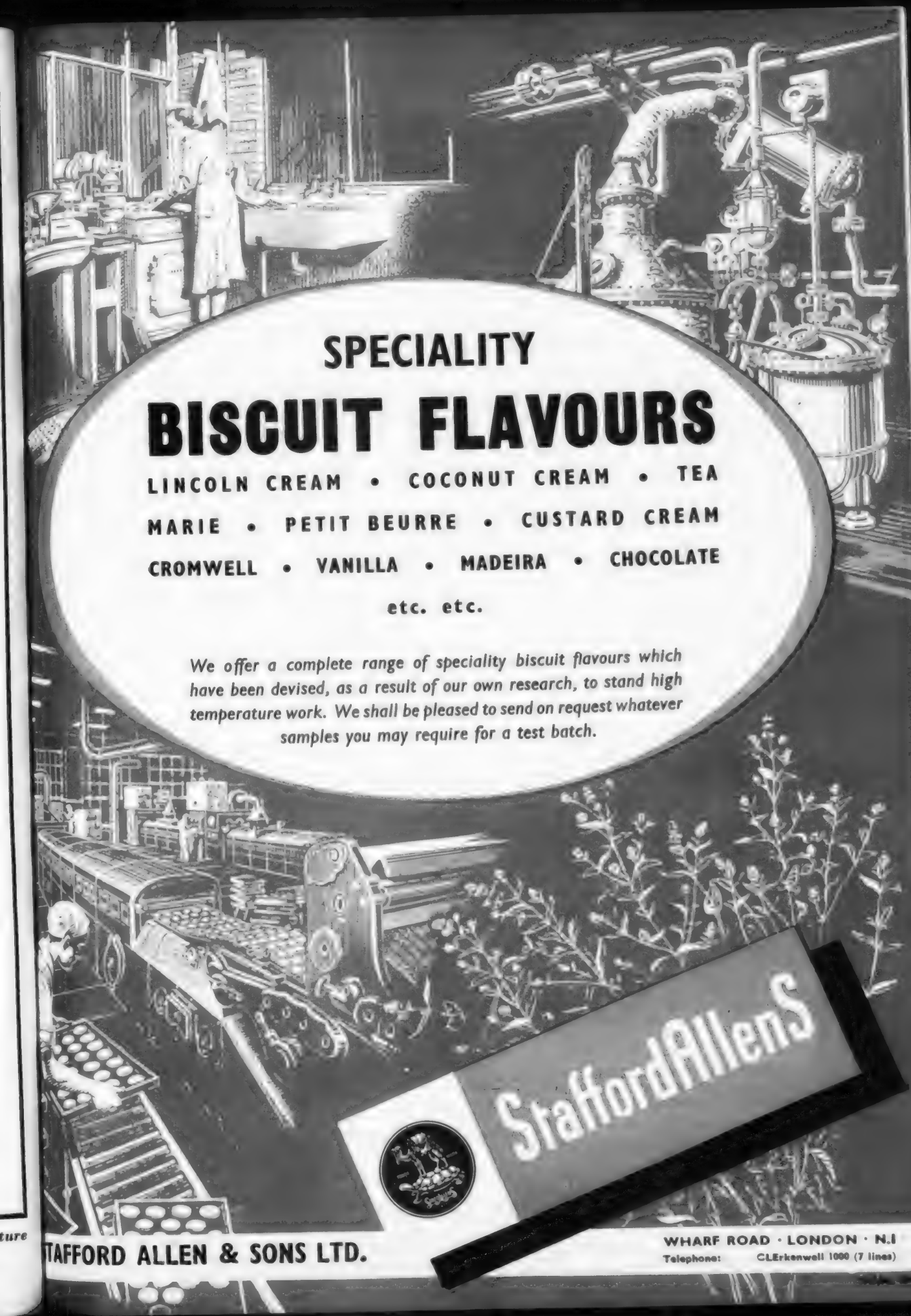
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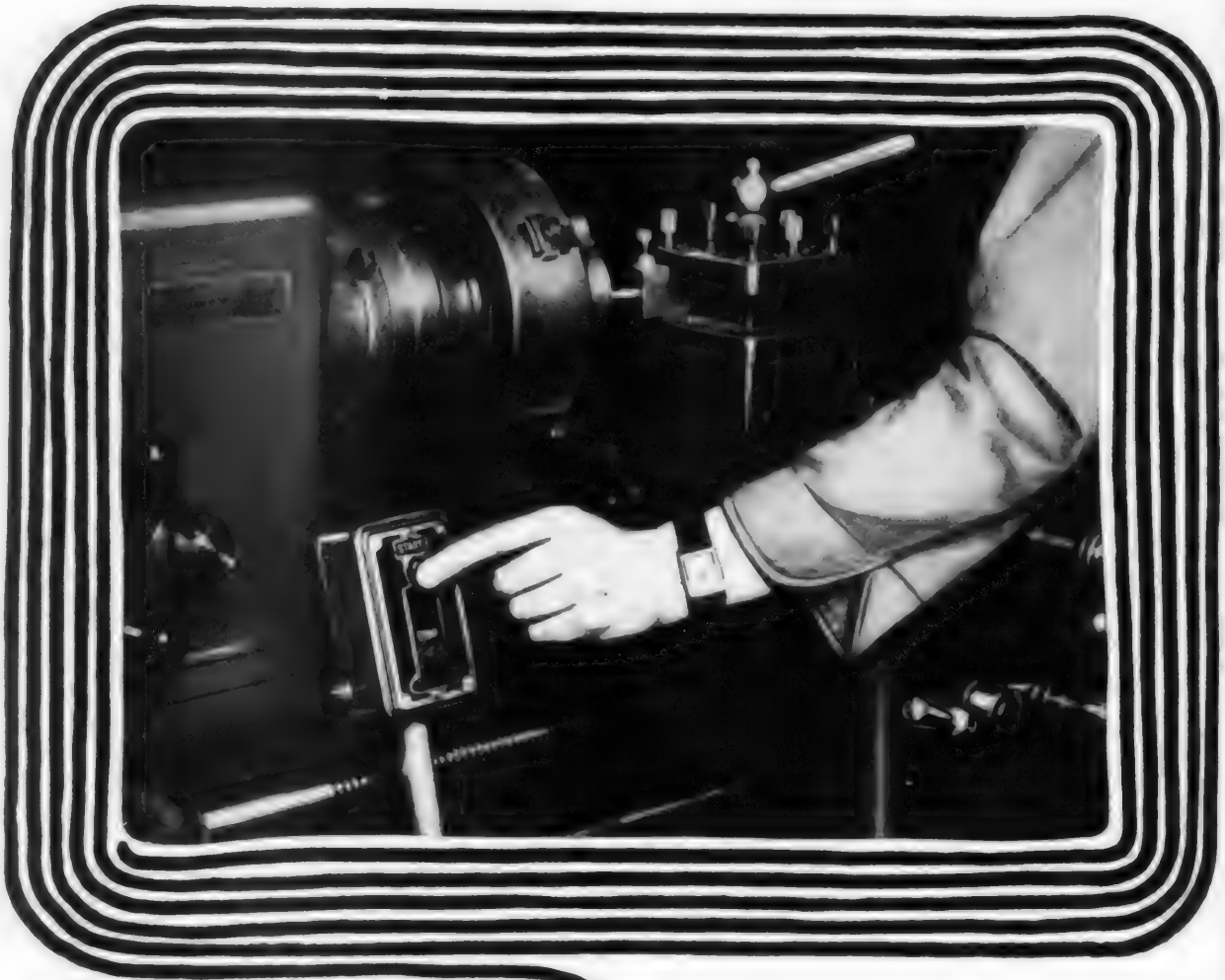
Having a hand in Productivity



The Finger on the Button

And the eye on the job—the brain too. The machine under the control of a button, the man free to use all his skill. Working without worry, without distraction, a man can work faster, less tiringly.

The machine is a lathe, set up for boring. Accurate work, careful work, but the push button can make it fast work. The hand on the button is symbolic. By freeing skill from unnecessary distractions, electric control speeds up production, raises productivity—and lowers costs and improves accuracy. Push button control is ONLY ONE OF THE AIDS TO HIGHER PRODUCTIVITY THAT ELECTRICITY CAN BRING YOU.

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IN EVERY INDUSTRY OR TRADE, electrical equipment is the key to modern production methods. There are probably more production-boosting and money-saving devices than you know of. Your Electricity Board can help you and give you sound advice.

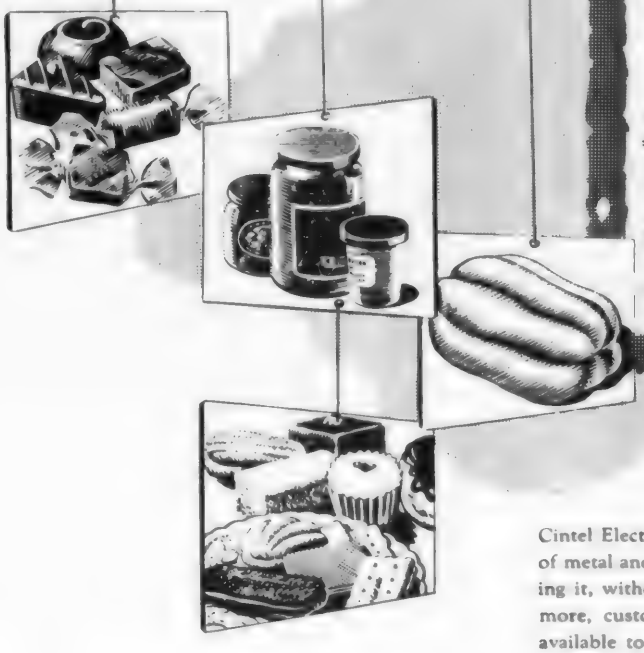
They can also make available to you, on free loan, several films on the uses of electricity in Industry—produced by the Electrical Development Association.

E.D.A. are publishing a series of books on "Electricity and Productivity". Four titles are available at the moment; they deal with Higher Production, Lighting, Materials Handling, and Resistance Heating. The books are 8/6 each (9/- post free), and the Electricity Boards (or E.D.A. themselves) can supply you.

Electricity a Power of Good for PRODUCTIVITY

Only a small piece of metal

BUT
BIG ENOUGH TO DAMAGE
A REPUTATION



Metal in Food

HEAVY FINES IMPOSED

A bakery firm, [redacted], answered two summonses at [redacted] Magistrates' Court yesterday, for selling food unfit for human consumption. It was alleged that part of a razor blade was found in a bun, and a piece of metal in a loaf of bread.

Cintel Electronic Metal Detectors will find any type of metal and automatically eject the product containing it, without production "hold ups". What is more, customer goodwill is ensured. Full details available to you on request.

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Why FLEXIBLE MOISTURE PROOF TRANSPARENT Dio*thene* (POLYETHYLENE) *is ideal for* PACKAGING *FOOD*

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PROTECTIVELY TOUGH

DIOthene *stretches*, so is not easily burst nor punctured. It is unaffected by acids and alkalis; liquid proof; powder proof; moisture vapour proof. Virtually non-inflammable and frost resisting, it is excellent for tropical or deep freeze storage. DIOthene is ideal for packing in units or in bulk.

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DIOthene is extruded in tubular form at a very high temperature. It is *sterile*, and the all-important inner surface *remains* sterile. No plasticiser is used; the purest products can be wrapped indefinitely with no fear of contamination from within or without.

AND SELL

DIOthene, with its silvery sheen has immediate eye and appetite appeal. The customer can *see* your product in DIOthene and its silkiness adds that touch of luxury that prompts impulse purchase. It also ensures flavour protection. *Excellent re-use value for the housewife.*

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NUTS & RAISINS

in Dio*thene* (POLYETHYLENE)

We can offer you DIOthene bags and DIOthene drum liners to required sizes and thicknesses, plain or gussetted, for quick delivery. **Our special printing on DIOthene in monochrome or multi-colour—including gold—gives excellent ink adhesion.** We can add the properties of DIOthene to paper, board, foils or fabrics by coating or lamination—infinite possibilities! We make, convert, design and print DIOthene wrappings all under one roof. Send us your enquiries: ask for more details. Write or 'phone today.

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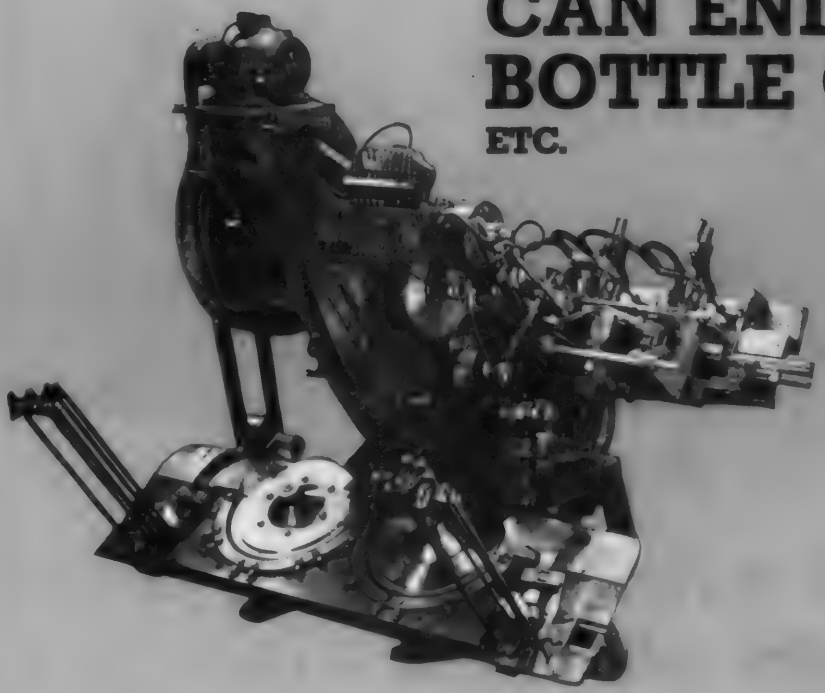

One, two, three or even five stampings at each stroke can be accurately blanked and formed in Bliss Automatic Strip Feed Presses. Built in three sizes, 20, 25 and 40 ton capacities, they are simple and economical in operation. These time-saving producers conserve hard-to-get tinplate because their precise spacing and cutting keep scrap down to a minimum—a vital consideration these days.

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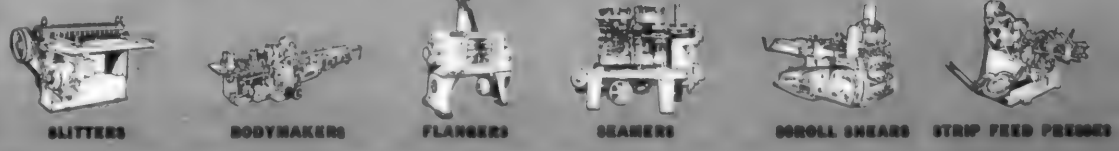

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COLTS were consulted by Farley's Infant Food Ltd. to advise with regard to the improvement in the ventilation of their Bakery and Canteen. The problem was to overcome the effects of solar radiation, radiant heat from plant and high air temperatures.

A combination of three different types of ventilators was used to result in a continuous high rate of air change without cold draughts and with local supplies of air movement for man-cooling purposes—the ideal solution to the problem.

COLTS wide experience in the ventilation of all types of buildings throughout industry is at your disposal. Why not take advantage of it?

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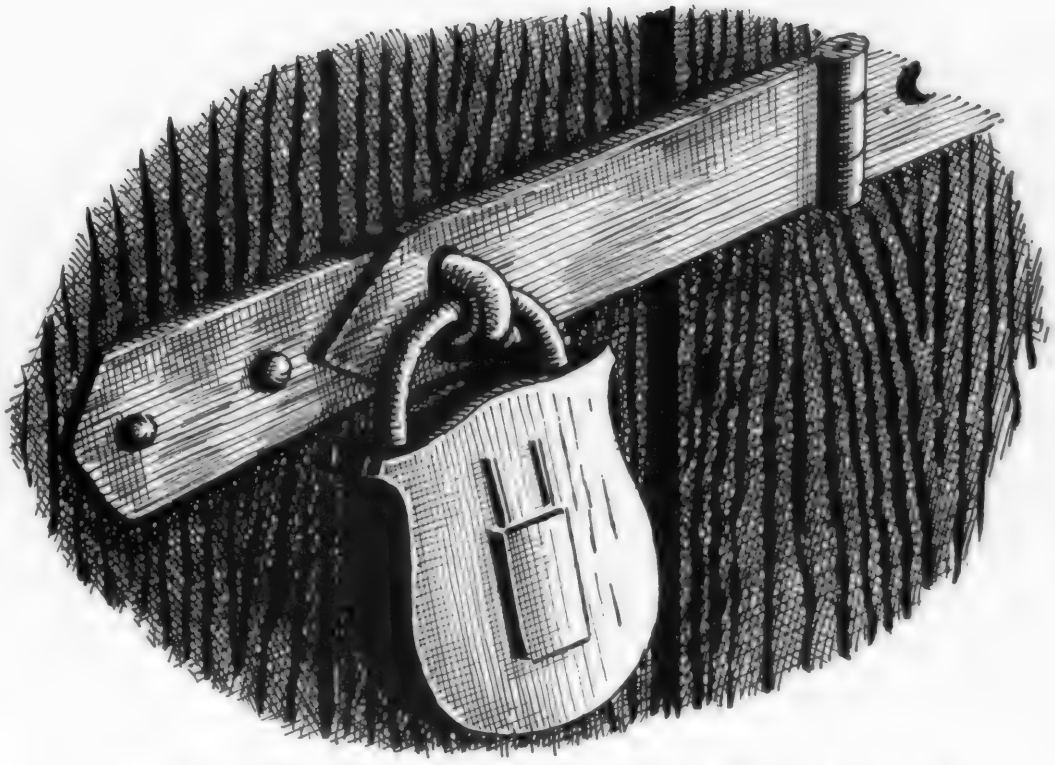

SECURELY PADLOCKED

but not against these thieves!

Flour beetle.
Actual size approx. 4 mm.

Cacao moth larva.
Actual size approx. 11 mm.

Bolts and bars can't stop insect pests robbing your stocks of flour, cereals and other foodstuffs. Good hygiene may minimise the trouble, but to prevent it something more is needed.

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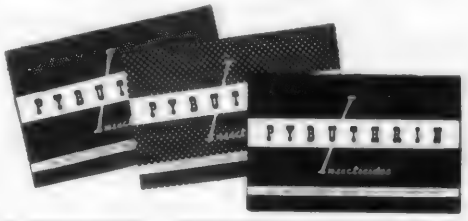
PYBUTHRIN is a mixture of piperonyl butoxide and pyrethrins. It is the active principle of a range of potent, easily applied insecticides, which are safe to use in the presence of foods yet produce a much greater kill than preparations containing an equivalent amount of pyrethrins alone. Different formulations and methods of application may be required for different insects and circumstances. Write for a copy of the booklet listed below which applies to *your* business.

"Pybuthrin" Insecticides for :— **1.** *Pests of Cereals & Cereal Products.* **2.** *Pests of Bacon & Ham.* **3.** *Pests of Cocoa Beans, Chocolate, Nuts etc.*

PYBUTHRIN



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Biscuit marshmallow, candy marshmallow and marshmallow creme are thoroughly whipped, precisely aerated and correctly cooled in this carefully controlled continuous closed system. The Votator marshmallow processing apparatus gives you the following advantages:

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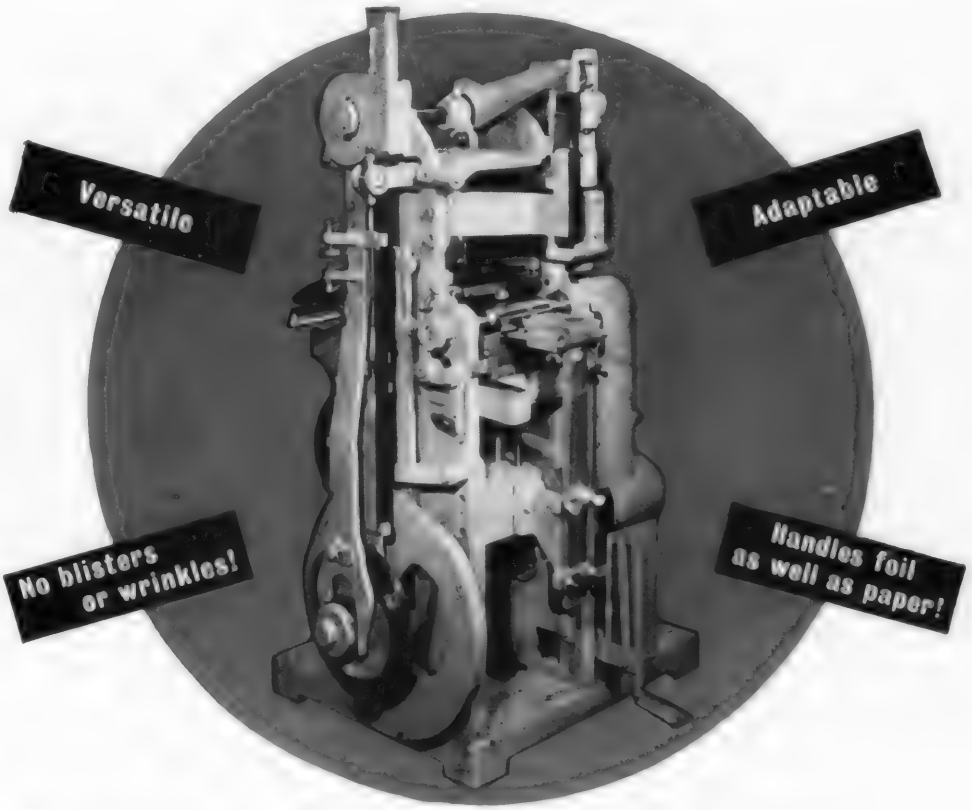

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THE CIDER FACTORY
Plant and Layout

TECHNICAL PUBLICATION No. 2 OF THE RURAL ENGINEERING SERVICE OF THE FRENCH MINISTRY OF AGRICULTURE

English translation and diagrams prepared by

V. L. S. CHARLEY, B.Sc., Ph.D.
PAMELA M. MUMFORD
and E. J. MARTIN

122 pp. Illustrated. Price 20s. postage 4d. U.K., 10d. Abroad.

THIS book is a translation of a publication issued by the French Ministry of Agriculture in association with technical services of the French cider industry. Although the text deals primarily with the layout and equipment of a cider factory there is a brief description of the principles involved in each process. Fifty-four detailed drawings are given, showing accepted layouts for buildings and plant in the cider factory. Perhaps one of the most interesting features in the book for English cider makers will be the wealth of information on refrigeration and cold storage of cider. There is an abundance of drawings clearly illustrating the latest types of cool storage installations in France, and such drawings are now being made available in the English language for the first time.

CONTENTS : General information on Cider Making. Construction and Management of the Cider Factory. The Factory Entrance. Reception and Storage of Fruit. Handling of fruit. Milling of Fruit. Keeving and Racking. Construction and Equipment of the Keeving Building. Special Machine Room. Refrigeration Equipment. Steam Production. Pipelines. The Distillery. The Laboratory. Water Supply. Ventilation. Drainage. Electrical Installations. Subsidiary Buildings. Specification of Plant. Appendices.

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M-W.56

It is only during the past two or three decades that the real nature of the illnesses commonly grouped together under the popular term food poisoning has been shown. The author has done a great service to food manufacturers, handlers, officers of health and medical men in his work

FOOD POISONING

by E. B. Dewberry

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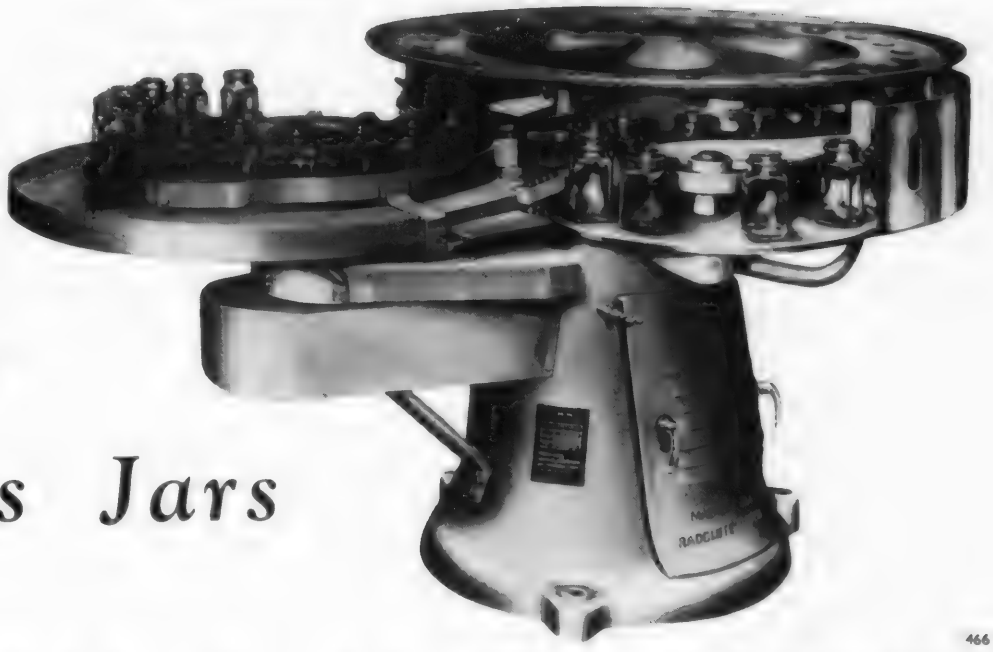

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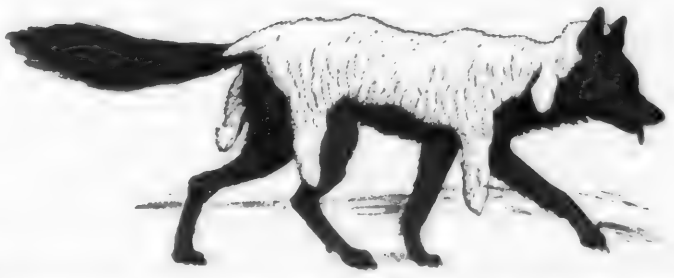

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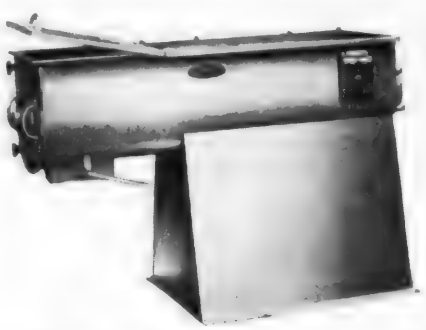

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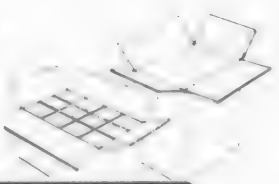

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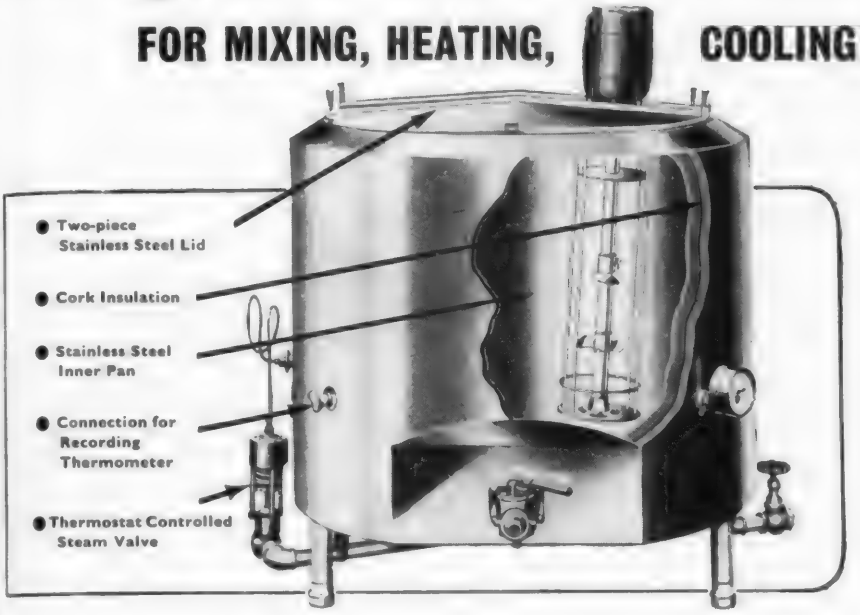

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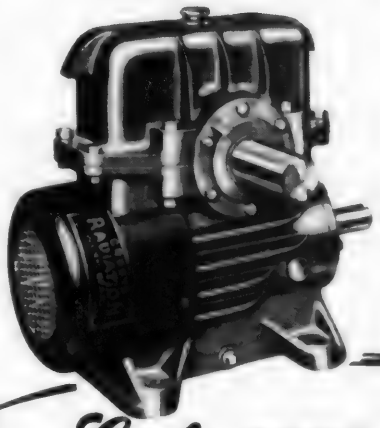

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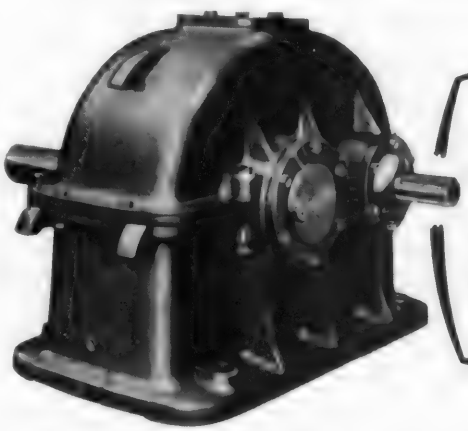

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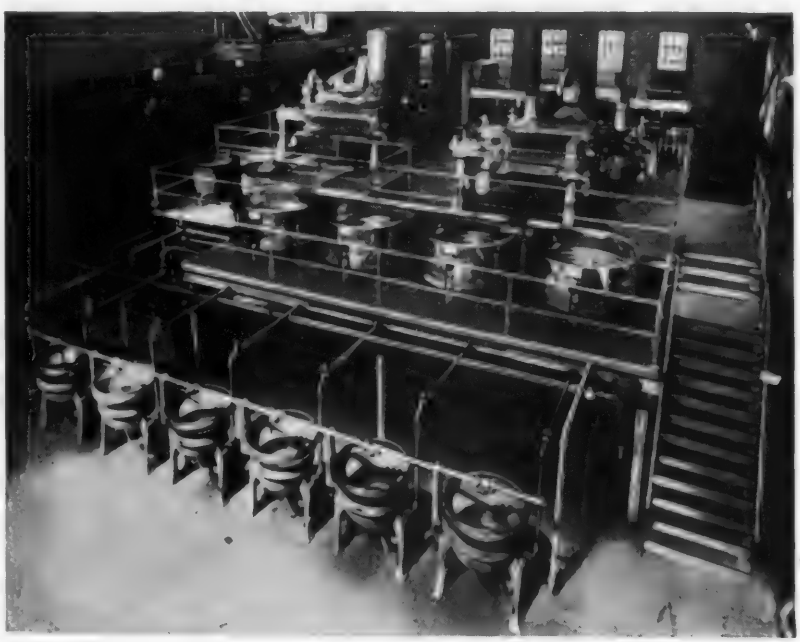

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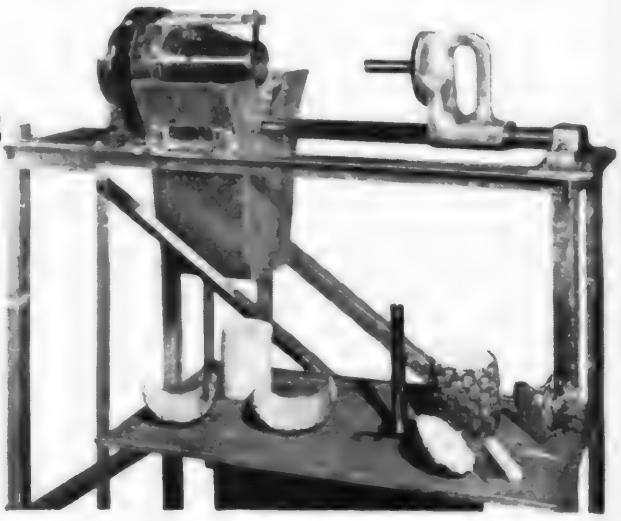

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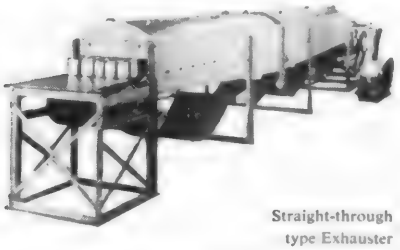

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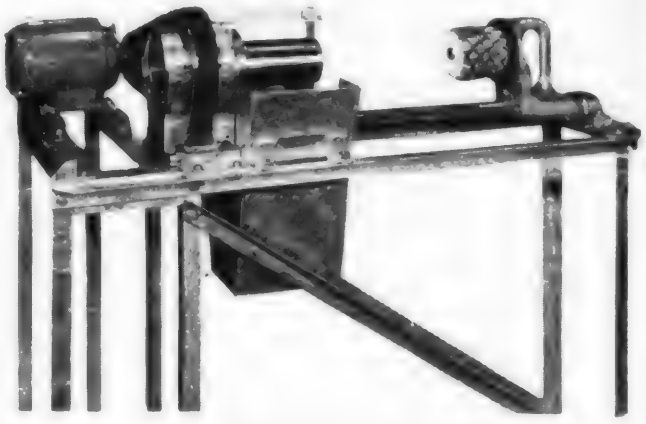

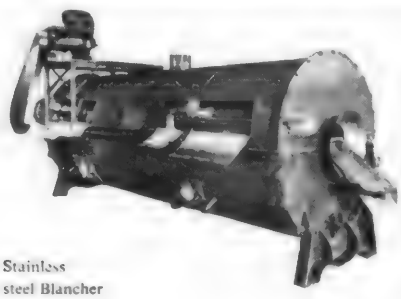

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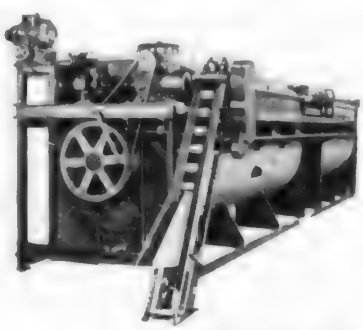

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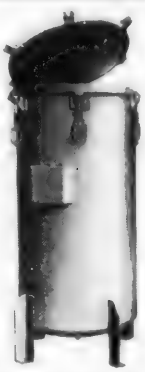

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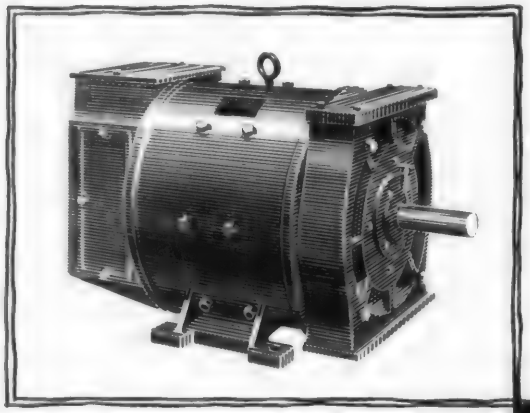

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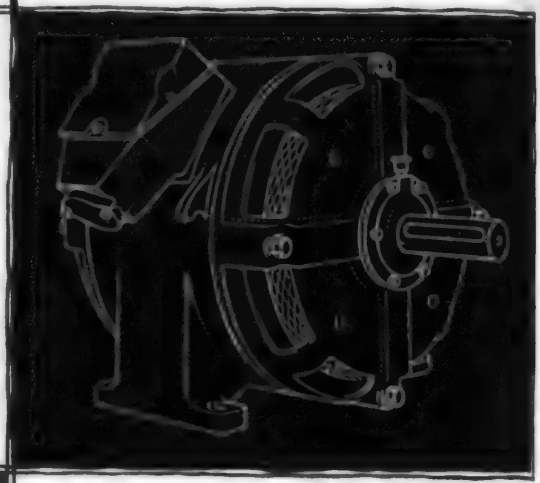

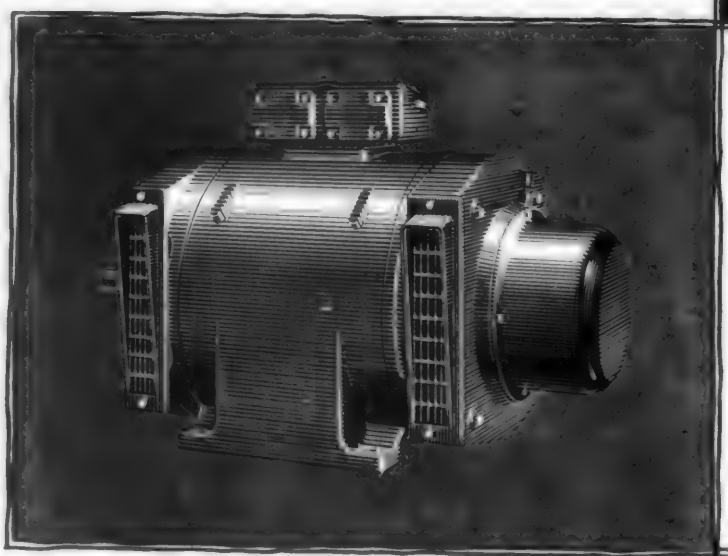

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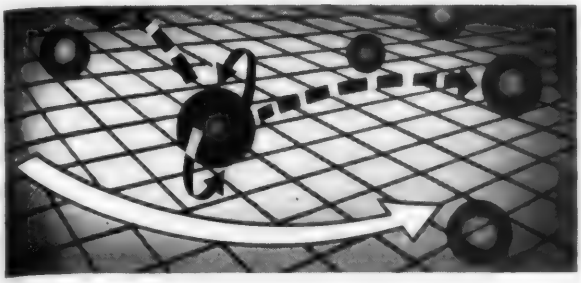
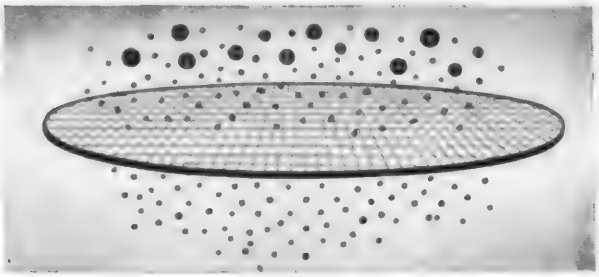


The rolling motion means that the particles (shown here widely separated, for clarity) go either *through* an aperture or past it. The material thus cannot "blind" in the mesh.



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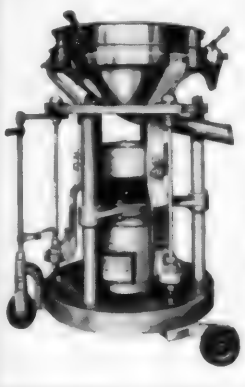

Standard (Constant-Speed) Model. (Approx. 2' × 3'; weight 4¼ cwt.) giving efficient sieving even with 300 mesh; also ideal for straining.

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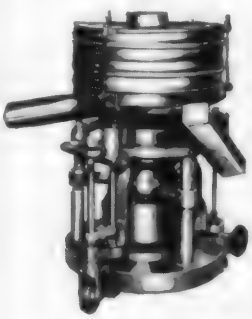

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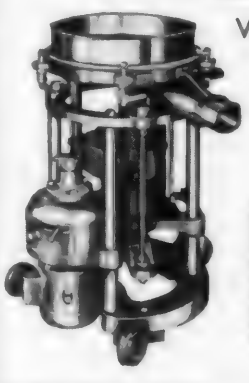

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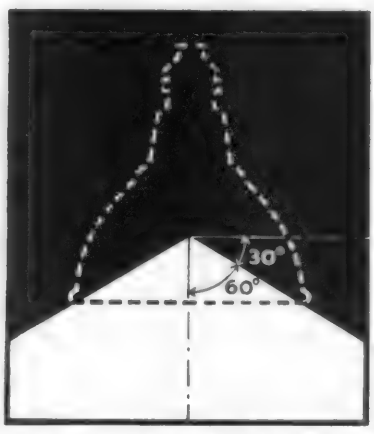

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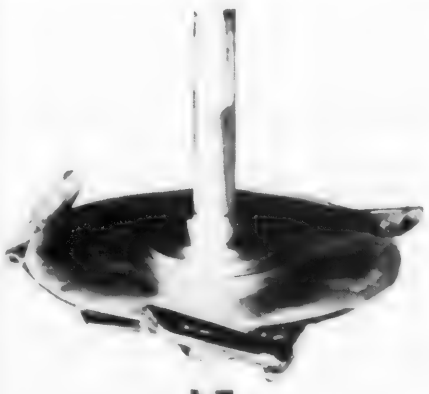

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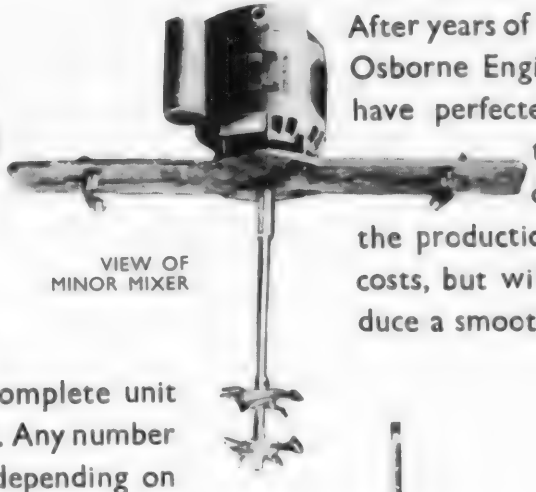

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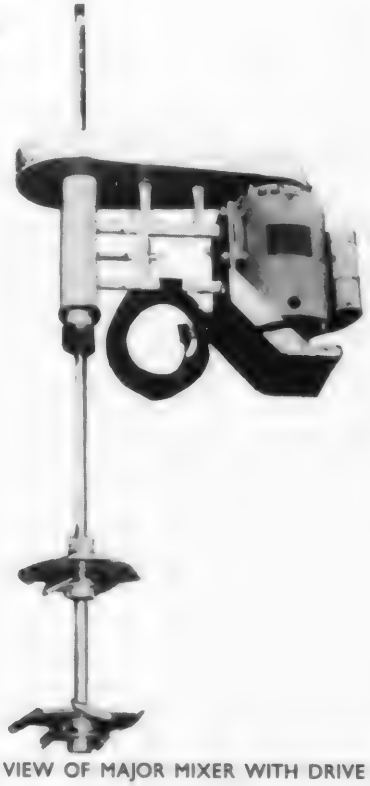

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FOOD MANUFACTURE

Vol. XXIX. No. 6 · Published Monthly · June 1, 1954

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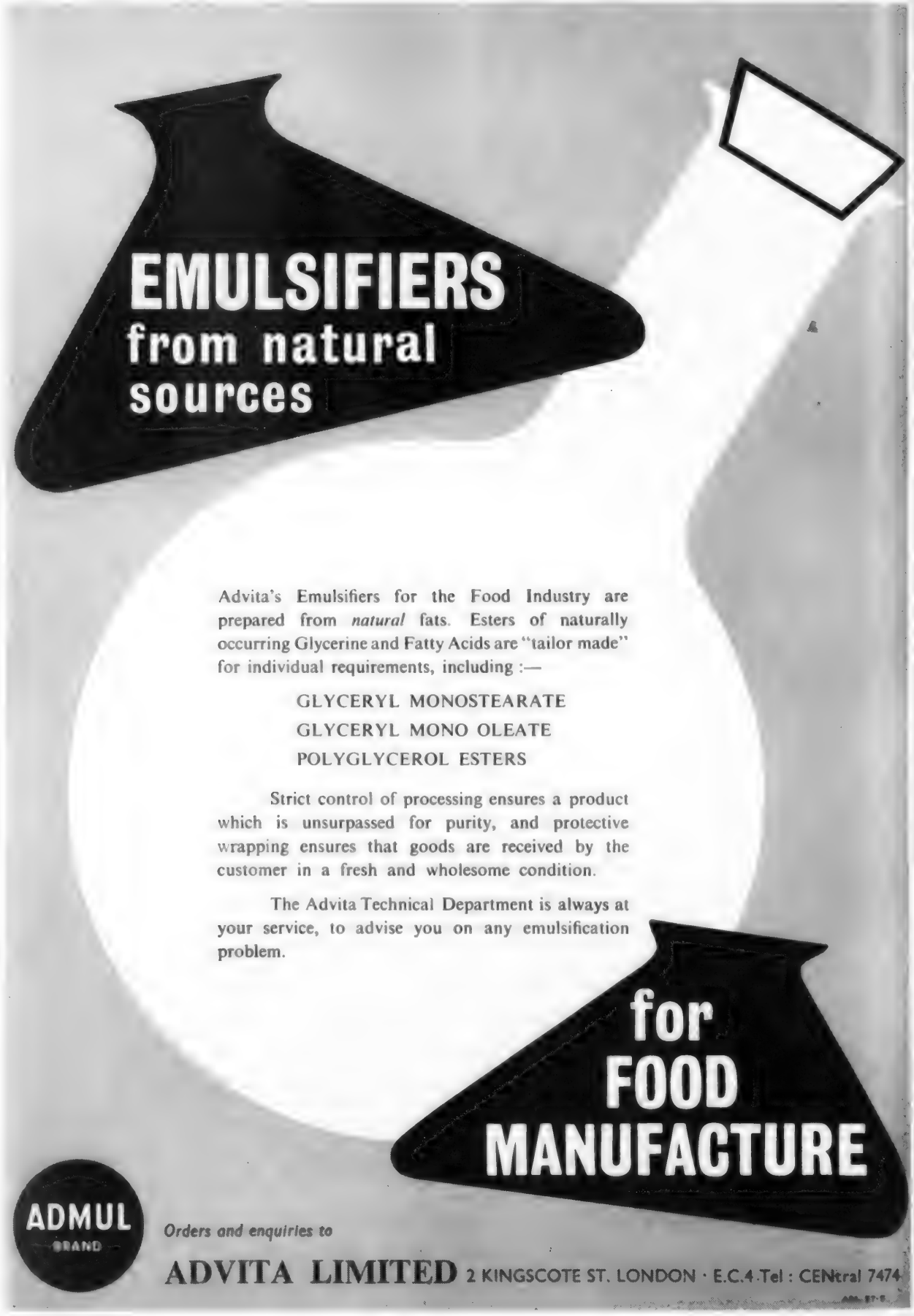
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FOOD MANUFACTURE

Vol. XXIX, No. 6 June 1, 1954

Sausage Standards Again

LAST October we commented on the confusion caused by the revocation of the various Meat Products Orders and suggested that one day it might be left to the Lord Chief Justice to deliver a judgment on the question: What is a sausage? That day arrived a week or two ago when a case in the Queen's Bench Division was heard before the Lord Chief Justice and two other Judges. They held that the defendants should have been convicted for selling pork sausages with a meat content of only 55·4 per cent., and allowed an appeal by the prosecutor from the dismissal by Coventry justices of two informations alleging that the defendants sold pork sausages not of the quality and substance demanded by the purchaser, in that they were deficient in meat, contrary to section 3 (1) of the Food and Drugs Act, 1938.

The Lord Chief Justice said he would like to know what a pork sausage was. The case raised a difficult question caused by the absence of any standard. No one had been bold enough yet to lay down the composition of a sausage.

The contents of a sausage had long been the subject of pantomime jokes, and humorous writers had written about them. There being no standard laid down by the Government departments, the justices themselves had to say what constituted a sausage. They had to find whether the article complied with some notional standard which they found on the evidence.

On the evidence placed before them, the justices should have said that it was the consensus of opinion that pork sausages should contain 65 per cent. of meat. Both sides considered 65 per cent. the appropriate amount, and as the sausages contained only 55 per cent., there was an obvious deficiency. They were not the finest pork sausages and were sold to the prejudice of the purchaser. The cause would therefore be sent back to the justices with a direction to convict.

We understand that local authorities throughout the country have asked the Minister of Food to revive the regulation that pork sausages should contain at least 65 per cent. of meat—a procedure that would avoid this sort of vexatious litigation.

Mediocre Kippers

A GOOD measure of advice was dispensed by Dr. Charles L. Cutting, officer-in-charge of the D.S.I.R. Humber Laboratory, Hull, at the Joint Fish Trades Convention at Bournemouth.

Emphasising that he was expressing personal opinions, Dr. Cutting made 25 suggestions for improving the quality of fish, among which were included the use of more ice and proper freezing at sea. At the markets, fish should be condemned not only by reason of poor quality, but on what its quality would be by the time it reached the consumer—say 48 hours later.

He proposed measures of better handling by the merchants and said that the curers should smoke the best rather than the poorer qualities, that there should be better chilling during transport, and that retailers should handle their fish more hygienically.

On the subject of kippers, Dr. Cutting said that far too many of them were mediocre, by reason of the poor quality of the herring allowed to be processed. Fish was overlanded long distances in summer, often without ice. It was often brought from Norway for kippering, arriving up to six days after being caught.

Discussing measures proposed for adding antiseptics to ice, he said that nothing remarkable had yet been discovered that was likely to be permitted. That was not to say that one or other of the newer antibiotics such as aureomycin now being experimented with in Canada might not ultimately prove to be effective.

Mechanisation in the Tea Industry

AMONG the articles in the May issue of "World Crops" devoted mainly to the subject of tea, are two which deal with possible methods of mechanising tea cultivation.

It is possible that some form of mechanical tea harvester, powered electrically or by petrol, carried by the operator in the field, could be evolved, but to warrant its adoption and the heavy capital expenditure involved, its rate of delivery would have to be many times faster than that already achieved by female workers who have acquired amazing rapidity in plucking by hand.

Although much effort is being expended in attempts to develop such a form of portable plucker, it seems probable that the problem of mechanisation might best be solved by the development of hedge planting. By this system, the tea is grown in broad hedges with a curved top planted at a sufficient distance apart to allow the passage of implements which straddle the tea bushes and can be used both for plucking and pruning.

Such a layout is bound to be expensive in the first place, since it must involve the uprooting and replanting of much established tea, but its adoption would save much labour not only in plucking and pruning, but also in weeding, cultivation, and the application of manures. Trials on these lines are being made in Northern India and on the tea plantations of South Russia.

The writer of the leader in "World Crops" adds the warning that if such methods proved effective and were adopted on a large scale in those parts of the world where tea is grown, they would be likely to give rise to serious unemployment, which in turn might aggravate the political unrest already rife.

Myxomatosis Report

SIX meetings and the consideration of written evidence from interested organisations and individuals and of 24 other memoranda prepared for the information of the Advisory Committee appointed to advise on the problems arising in connexion with myxomatosis in rabbits have resulted (except in the case of the protection of the domestic rabbit) in the adoption of the principle of *laissez faire* by the Government which, judging from the wide discussions that have taken place since the disease appeared in Great Britain, was only to be expected.

The recommendations upon which this policy has been based may be summarised as follows:

1. No attempt should be made to assist the spread of the disease or to introduce it into unaffected areas of the country.
2. The disease should be allowed to run its natural course among wild rabbits.
3. Advantage should be taken of the opportunity, where outbreaks occur, of eliminating the survivors before they build up in numbers again.
4. Special consideration should be given to the protection of the domestic rabbit.
5. The import of live rabbits, such as the cottontail rabbit, should be prevented; while harbouring the virus, it might itself become a pest.

The legal reasons for not recommending the deliberate spreading of the disease are complicated to say the least. Whatever may be the position in law of a person who transports a diseased rabbit from one place to another, the Committee has been advised that it is likely that a person who deliberately takes a rabbit and inoculates it with the virus would be committing one or both of the offences of "doing an act causing unnecessary suffering to an animal" and "administering a poison to an animal without reasonable cause or excuse" (Protection of Animals Act, 1911, Section 1, and Protection of Animals (Scotland) Act, 1912, Section 1). It is puzzling to find the difference between the two methods of deliberate spreading.

In the meantime, the four main groups comprising (*a*) the animal welfare societies, (*b*) the agricultural and forestry interests, (*c*) the rabbit meat, fur felt, and hat trades, and (*d*) the domestic rabbit interests doubtless will continue to argue the points for a long time to come.

Australian Meat Marketing

As the result of the change over from bulk purchase of Australian meat to private trade, a new marketing situation has been created.

Australia will receive whatever market price may obtain after derationing and decontrol from bulk purchasing have taken place, giving a free market for the first time in 15 years. There will be an important difference. The United Kingdom Government will guarantee that average returns on the U.K. market during 1954-55 will not be less than 95 per cent. of the average return for 1953-54 for beef, 93 per cent. for lamb and first quality mutton, 90 per cent. for second grade mutton, 85 per cent. for third grade mutton, and 75 per cent. for ewe mutton.

Under the terms of the 15 year agreement which are applicable after the end of bulk purchase, Australia will continue to have the right to export the full requirements of meat to British Colonies and dependencies (amounting to about 20,000 tons a year) and will continue to negotiate each year a quantity of "free quota" meat which can be exported to any market at the discretion of the Australian Government. This quantity will be at least 3 per cent. of the exports to the United Kingdom, but may be negotiated at a higher level.

Hunting the Shark

THE White Fish Authority, in co-operation with the Scottish Home Department, has sponsored a four-week trip off the Shetlands to determine the value of shark hunting to the Scottish fishing economy. At present, the Danes and Norwegians carry on a major trade in shark carcasses which are bought by Italy, the flesh being processed for the production of oils and the meat canned for export to South America. The skin is used for footwear and handbag production.

From the viewpoint of production, the value of this development lies in the extra source of income it would bring to North of Scotland fishermen, whose turnover from traditional sources has been hit severely by recent conditions.

In addition to this official trip, a number of boats are planning to start work independently.

Fruit Curds and Orange Juice

TOWARDS the end of the last war it was stated confidently that the Ministry of Food had come to stay, and that British food legislation methods would follow more closely those of the United States, Canada, and Australia. Unfortunately, the process of legislation here is not so rapid or so readily adaptable, as so many would-be manufacturers have found to their cost.

This lack of flexibility is at times disturbing; when the advice of the law makers, *i.e.* the advisers of the Ministry concerned, is sought, it is often learnt that any matter in dispute is either clear cut against the manufacturer, or that only the Courts can interpret the law. For example, the Food Standards (Preserves) Order allows for the manufacture and sale of fruit curds, and stipulates that these must contain either 0·125 per cent. of oil of lemon or 0·25 per cent. of oil of orange. Many manufacturers find that if they wish to make a pineapple, banana, or other curd, they are obliged to add one of these substances to it—substances that not only cost money, but which will also entirely change the taste of their products.

Another example is contained in the Food Standards (Soft Drinks) Order, 1953, which allows the manufacture and sale of drinks made from whole fresh oranges. The Order does not state how much of the whole fresh orange is to be contained in the drink—it merely says that they are to be made from not less than 5½ lb. or 27½ lb. of whole fresh oranges per 10 gallons for " ready-to-drink " and for concentrated beverages respectively.

So far as we are aware, this is the only legal document imposing so loose a standard. When the oranges are comminuted, the juice, flavoured with oil from the peel, that is obtained is used for orange drinks, and the remainder for marmalade manufacture. How one batch of oranges can comply with the requirements of two Orders is beyond our comprehension.

Icelandic Fish

FOLLOWING a tour of Newcastle, Sunderland, and North Shields, Mr. F. Huntley Woodcock, Fisheries Attaché to the Icelandic Legation, reported a keen desire on the part of Tyneside to secure the Icelandic fish trade boycotted by Grimsby. During his visit he discussed with Council officials and business men the Icelandic trawler owners' proposal to provide in this country facilities for landing and marketing their fish, this being done at their own expense.

Mr. Oliver Smedley, member of the Liberal executive, who had mentioned this matter at the recent Buxton assembly, told a FOOD MANUFACTURE representative that he understood that the whole mounting hostility between our fishermen and those of Iceland stems from the imposition of a 10 per cent. duty on all imported fish taken by other than British fishermen following the Ottawa Conference in 1932. At the present day, there are many interests concerned, other than the trawler owners'. Not only are the consumers interested in getting good quality fresh fish at prices they can afford to pay, but there is also much distress among certain exporting interests who used to find a good market for their goods in Iceland. As Iceland no longer receives sterling for their fish, they are unable to buy manufactured goods from Great Britain.

Although, therefore, the ban on Icelandic fish is intended to protect employment among British fishermen, the resulting situation is that German and not British fishermen are reaping the benefit at the expense of Icelandic fishermen in this country; the employment of workers in industries which relied on exporting goods to Iceland is gravely threatened; and the prosperity of the fishing ports into which the Icelandic fishermen used to come, particularly Grimsby, is gravely reduced as a result of losing the trade which used to accrue to them from the money spent by the Icelanders. For instance, the Icelandic trawlers used to take about 250 tons of oil per trip at just over £8 per ton from the port; they usually store at the port and spend substantial sums on nets, provisions, etc.; and they usually carry a crew of 40, twice the number carried on British trawlers, and spend quite a lot of money in the town.

In view of the confused situation and the different interests involved, the term "Cinderella of the Food Industry" recently applied to the fish industry seems to be well justified.

Dawson and the Fishermen

REPLYING to a statement attributed to Mr. George Dawson at his Press conference that 75 per cent. of Cornwall's pilchard fishermen were unemployed because there was no market, Mr. R. Piggott, of Looe, honorary secretary of the British Pilchard Canners Association, points out that this may have been true at the time, but the statement as published was misleading in that it took no account of the seasonal nature of much of the fishing in Cornwall.

Pilchards, in common with many other fish, are at their best from May to September, when they are delicately flavoured, soft, and small; from October to mid-January they are larger, firmer, and more matured, but for the 10 weeks or so until May they are usually deficient in fat and meagre in appearance.

For that reason, says Mr. Piggott, the period from mid-January until May is the one in which pilchard canners and curers will show little interest in pilchard landings. Many Looe fishermen, recognising this, have turned to other types of fishing—in January to mackerel and in March onwards to long-lining for white fish, with some dual-purpose vessels fishing for crab and lobster.

Not enough is yet known about the habits of pilchards to enable forecasts to be made of where and when the best quality fish are likely to be found, and the pilchard fishermen have to rely on their traditional skill to enable them to locate and catch those fish at their best. It is therefore heartening to learn that the Ministry of Agriculture and Fisheries has recently indicated that a second pilchard survey is likely to take place in Cornish waters this year, in continuance of the earlier studies of pilchard stocks in the Channel. This may reveal the existence of far greater shoals of fish than has been hitherto envisaged.

Quinoa—Food from the Andes

THE small annual herb Quinoa, of the goosefoot family (*Chenopodiaceae*) very similar to the common lamb's quarters, has recently been studied by Dr. Alejandro Quesada, one of FAO's technical assistance experts and member of a joint United Nations Mission in Peru.

For centuries Quinoa has been one of the staple foods of the people living on the Andean plateau. The plant produces very small seeds, which are ground into meal and made into cakes or gruel.

Investigations revealed that, as cultivated at present, a very low yield is obtained, ripening is uneven, and threshing difficult; moreover, the finished product has a strong soapy taste. These drawbacks have now been overcome and Quinoa is being processed in a form similar to corn flakes.

A recent analysis has shown that its protein content is 10·7 per cent., its calorific value is 355 per 100 g., and it contains appreciable amounts of calcium, sulphur, iron, thiamine, and riboflavin.

FAO has been called in for consultation by a great number of Latin American Governments, who are fighting the growing food shortage and malnutrition existing in their areas. Such things as the "rediscovery" of Quinoa are making a substantial international contribution to the welfare of the peoples of Latin America.

The Proof of the Pudding

THAT the unending discontent expressed by tongue and pen on the shortcomings of British cookery may be allayed in the near future, was portended by a ceremony held recently at the Royal Festival Hall, when 12 finalists met in the last round of a youth cookery competition organised by the Gas Council, and open to boys and girls between the ages of 15 and 19 years.

Twenty thousand entries were received, a very large number of these somewhat surprisingly falling at the first obstacle—a poached egg on toast. Quite a few still remained after the second round, which consisted of a grilled macaroni cheese, but the two-course meal of baked stuffed haddock and Bakewell tart in the third round proved the downfall of many. The tests for the area finals, which were two-course meals for four people from a given list of ingredients only, narrowed the field still more.

Of the finalists, two were young men, one of whom, doubtless to the dismay of his sister cooks, was invested with the proud title of National Youth Cookery Champion. However, to have been a semi-finalist was an achievement, as doubtless the young women will be qualified in due course effectively to follow the traditional recipe for matrimonial felicity —"Feed the Brute."

Margarine Story

MAY 10 was a red-letter day for margarine and cooking fat manufacturers—the day on which they were free to sell their individual brands. No longer is mere "marge" or cooking fat bought, but packets of products glorified by seductive names which will probably be among the factors influencing the wavering purchaser.

With the high price of butter, prospects for margarine have remained bright despite all the old prejudice against substitutes, a prejudice with an amusing history of its own. The first samples prepared by Mège-Mouriés were disappointing even to the pioneer himself, since they lacked the true butter flavour; hence his "off the rail" experiments with chopped cows' udder in processing suet, followed by the more inspired idea of adding warm milk. Although he approached as near to butter flavour as possible in his day, "butterine" won poor support.

For a real witch-hunt our national Press, and particularly *The Times* of 1873 and 1876, could not be bettered. Referring to the success of Parof in New York, and to the lack of any obstacle to "driving genuine butter out of the market," there follows a reference to operations in England with raw material from "the fat of horses from the knackers." In December, 1876, came the climax of hunting the villains secretly processing crude fats into "spurious butter." Down Thames-side to the outfall of the North Metropolitan sewer went the chase, with Press representatives coming across men salvaging fatty refuse from the river—but only for candle-making, as it turned out!

Apart from unfounded prejudice, there is still the argument over the very name of margarine. When centenarian-chemist Chevreul gave this term to a eutectic mixture of fats not intended for edible use, he "started something" as the saying goes. "Margarites" from the Greek for "pearly lustre" has a hard *gamma* in it; yet this is forgotten or ignored by rival sticklers for hard or soft "g," for Maggie or Marge. One wag who couldn't care less pointed out that margarine with a soft "g" should spread better on toast!

A refrigerated trailer used for the retail delivery of Elven foods.

Quick Frozen Foods in France

France produces many regional food specialities, their varieties depending on a diversity of factors. Unfortunately, modern conditions have produced a decline in home cooking and even the caterers (with notable exceptions) have joined the home cook in relying more and more on mass-produced food. The expressed object of the *Société des Eleveurs Vendéens* is to remedy this by combining the latest freezing technique with the best traditions of French gastronomy, thus producing dishes prepared under the direction of an eminent chef and getting them to the table of the consumer, with the retailer as the only intermediary.

ONE of the most important requisites for the scheme evolved by the *Société des Eleveurs Vendéens* was to make available cold stores and freezing facilities as near as possible to productive centres and, in the case of meat, to the abattoir.

Geographically, the concern is well placed for such a venture. Originally devoted to the slaughter of cattle, it is established in the heart of the Poitou province in a rich cattle-raising area, the home of the well-known Parthenay breed of cattle, and a district devoted to the production of pigs, sheep, and poultry; vegetables come from the intensive market gardening area to the south of Nantes.

The preparation of the Elven dishes (the name is formed from the first letters of the words

In the meat preparation department, the meat is boned and trimmed.

Gas-heated cookers are used in the kitchens.

"*Eleveurs Vendéens*") takes place in the kitchens of the company's works at La Roche-sur-Yon, which are equipped with up-to-date processing machinery. The raw materials used for the dishes and the standardisation of their contents and flavour at every stage of production and storage are under the direct personal supervision of the chef in charge.

In addition to the culinary aspects, research work is carried out to solve such problems as deterioration of taste and texture that may present themselves.

Light metal alloys are largely used as components of the processing equipment. For instance, the vessels for the collection of blood are made of Almasilium, the meat is conveyed on trolleys of cast aluminium, the bones in baskets of cast A-G 3 alloy, and the vegetables stored in handling baskets of corrugated A-G 3 sheeting. Aluminium is also used for the kitchen equipment, kettles, tanks of all kinds, and even the wall linings.

Packaging Operations

It is also to aluminium that *Eleveurs Vendéens* have turned in looking for a packing material for their prepared dishes. This packing has been designed in such a way as to avoid unnecessary handling. The consumers can therefore be certain that they are the first to touch the dish which they are going to eat.

The dishes are presented in containers of thin aluminium sheet with sealed lid, and wrapped in cellulose film. Inserted between the film and the lid is a flyleaf stating the name of the dish, its composition and instructions for serving being stated on the back.

The reason why the *Société des Eleveurs Vendéens* has adopted an aluminium container is because the light metal has all the properties an ideal packing material ought to have, and particularly a packing material destined for deep frozen products. These properties may be listed as follows:

1. The packing material must have neither odour nor taste; it must not have a colouring effect on the contents, or any other harmful effect.
2. It must not impede the extraction of heat during the freezing process.
3. It must be moistureproof; it must not soften or tear, by the action of liquid ingredients, such as gravy.
4. It must be able to resist breakage at low temperatures.
5. It must be cheap and easy to use.
6. It must not adhere to the product.
7. It must be impermeable to fatty substances and must not swell as a result of contact with them.
8. It must be capable of receiving

In the vegetable preparation room, the diced vegetables are placed in handling baskets made of corrugated A-G 3 sheet.

The containers are made on the premises from aluminium strips of $\frac{9}{100}$ millimetres thickness.

the markings for the identification of the products.

9. It must permit warming up, either in a water bath or by direct heat.

Eleveur Vendéens make their own aluminium boxes, complying with the foregoing requirements, for packing their products. These boxes are manufactured from aluminium strips of $\frac{9}{100}$ millimetres thickness. A mobile punch drives the sheet between the ledges which mark the folds, a completely tight container without any fastenings thereby being obtained. The lid is also cut from the strip and shaped on a small press.

The aluminium boxes move in front of the women workers, who fill them with slices of meat, gravy, garnishing, vegetables, and sauce in predetermined quantities. The lid is then sealed, the flyleaf inserted, and the box wrapped in cellulose film on a Hayssen automatic machine at the rate of 40 boxes per minute. Immediately after packing, the dishes are subjected to the freezing process. For this purpose, the boxes are placed on metal frames and loaded into a tunnel where a blast of cold air at a temperature of $-45°C.$ ($-49°F.$) is produced by means

The aluminium containers are filled with slices of meat, gravy, vegetables, and garnishings in predetermined quantities.

Above: **The containers are wrapped in cellulose film.** *Below:* **The wrapped containers are passed to the deep freezing tunnel.**

of powerful fans. The frames containing the boxes are placed on a conveyor belt which moves at such a speed that the freezing process is wholly completed during its passage through the tunnel.

At the exit, the boxes are packed, 30 at a time, in outers of corrugated cardboard and immediately stored in a cold storage chamber maintained at −20°C. (−4°F.).

This chamber represents the first link of the chain of the distribution of deep-frozen products during which they are kept at a temperature around −18°C. (0°F.). Experience has shown that this temperature is necessary to preserve the qualities of the frozen product, hence the need to organise the storage, transport, distribution, and sales facilities at that temperature. Cold storage vans, kept at a temperature of −20°C. (−4°F.), permit the despatch of the containers to the local cold storage centres for distribution in urban areas.

From these centres, the containers are supplied only to those retailers possessing the requisite cold storage facilities. The number of such shops is still limited, but in view of the success of this scheme, many retailers are anxious to install the necessary equipment.

The preparation of the deep frozen foods for the table is simple.

The frozen containers are packed in cardboard outers and stored at −20°C.

They may be warmed up in a water bath or by turning the contents of the container into a saucepan, warming it slowly, and adding sufficient water to compensate for the evaporation of the sauce during the direct heating.

The list of Elven products comprises some 50 dishes with tempting names.

This time-saving scheme offers important advantages to the consumer and caterer, who will be able to vary menus with good quality French dishes.

The export of such products will provide excellent propaganda for France and her resources as well as increasing the amount of her foreign currency.

Pessimists express doubts about the likelihood of success for this deep freezing technique in France because of the discouraging failures of certain commercial ventures with fresh fruits and vegetables. The reasons for these setbacks were manifold, the main one being the lack of equipment to ensure the maintenance of constant temperatures throughout the whole processing and storage periods. Another factor was that the producers maintained prices at too high a level, under the influence of food shortages at the time. The need for large scale propaganda concerning the freezing process and its applications was not realised and out-dated official regulations have hampered developments.

All these aspects of the problem have been overcome by the *Société des Eleveurs Vendéens*, who have succeeded in setting before the public a first class product, prepared, transported, and stored in hygienic conditions, and sold at a reasonable price.

A general view of the refrigeration plant.

Hygiene in the Kitchen

At the symposium on food and nutrition held in conjunction with the Food Group of the Society of Chemical Industry during the recent Health Congress of the Royal Sanitary Institute, the subject was food hygiene and food preparation in the home and kitchen.

The practical treatment of the particular angle of the subject was a feature of the papers read which together should form a useful contribution to the literature.

The first paper, read by Dr. J. B. M. Coppock, B.Sc., Ph.D., F.R.I.C., was concerned with factors affecting the structure of the kitchen and larder. Domestic kitchens were rarely, if ever, specially designed; nor could they be considered solely as a working area for cooking alone, for often it was a place where meals might be eaten as well as prepared and where children might be playing while their mother did the laundry.

There was a wide choice of flooring materials, among which were concrete, granolithic concrete, terrazo and quarry tiles, magnesium oxychloride, and mastic asphalt, all of which had their advantages and disadvantages. The plastic, polyvinyl chloride, laid as tiles, was a newer material which seemed to have most of the qualities needed for a kitchen floor. Walls, ceilings, and the effect of fungicidal paints were also discussed.

The handling and storage of food materials was the subject of a paper by Miss E. Washington, B.A., Senior Dietitian, Ministry of Health. In their journey from shop to home, quite a lot of things might happen to foods. Heat and sunlight would decompose their ascorbic acid, and they might be infected by the bags and wrappings, by coughs and sneezes, and by the hands of the person handling them.

The speaker next discussed conditions of their storage pending the preparation of foods, detailing the special methods of storing various food materials.

At the outset of the paper on pitfalls in food preparation, Miss Mary Andross, B.Sc., F.R.I.C., Head of the Science Department, Glasgow and West of Scotland College of Domestic Science, said that during the last 20 years nutritionists had held the floor; nothing had seemed to matter but calories, minerals, and vitamins. Now we were beginning to realise that this was not the whole story. Food must be eaten before its consumer value could be considered. Anything, therefore, which caused adverse consumer prejudice was regarded as of extreme importance. Aroma, flavour, texture, and appearance had again come to matter, and pitfalls in food preparation must be watched for and avoided.

The speaker had found that investigations showed that for vegetables and fish, there was no price control and no regular correspondence between price and taste and appearance after cooking, and gave tables to illustrate these points.

In the actual preparation of foods for cooking each substance needed special methods; these were treated separately by the speaker, who gave a clear and interesting account of the various tissues composing muscle and the effect of different ways of cooking them. The pitfalls to be avoided in vegetable preparation and with eggs and flour products also came into the survey.

Miss B. R. Stanton, Dietetic Adviser, King Edward Hospital Fund, in the fourth and final paper of the symposium dealt with faulty cooking as a factor in nutrition. It was pointed out that there were no scientific standards whereby cooking, faulty or otherwise, at the domestic level could be judged, as the "standards" depended on the cook's opinion and taste. The effects of the cooking of meat, eggs, fish, milk, cheese, vegetables, and fruit, with particular regard to the loss of vitamins, were discussed; such losses might be due to culinary accidents, for which no scientific data were available, or to leach or other factors accompanying the cooking processes.

How to Feed 400,000,000 People

In the years following 1939, India's source of imported rice, Burma, was lost to Japan, and India herself was threatened by invasion, suffered internal difficulties, and endured one tragic famine. The story of the development of India's large scale programme of supplying food to the 400,000,000 people of India is given in a recent book.*

Sir Henry Knight's discussion begins with the problems that became apparent when Burma was invaded. Without rice imports, it was clear that food crises would arise unless administrative machinery was set up to organise imports, food grains were procured within India for supply and distribution, and food grains and other foodstuffs were rationed.

Many problems, including the mediaeval administration of many Indian states, and the difficulties of reconciling rival interest groups on food questions, delayed the effective functioning of such machinery. The turning point came with the tragedy of the Bengal Famine of 1943, which caused the deaths of probably one and a half million people. The first and unsuccessful efforts to deal with the disaster were followed by the creation of the Food Grains Policy Committee, whose lines of policy guided the Government of India in food administration. These were concerned with rationing programmes, the Basic Plan, the "Grow More Food" campaign, price control measures, and methods of meeting the challenge of reluctance to co-operate on the part of provincial and state governments.

The really remarkable thing about Indian food administration from 1939 to 1947 that may be gathered from this book is that there was only one famine; that the food crises of 1946 and 1947 were safely passed is proof that the policy laid down in 1943 by the Food Grains Policy Committee was sound, and saved India.

* *Food Administration in India, 1939-47.* By Sir Henry Knight, K.C.S.I., C.I.E. Pp. 323+xii. Stanford University Press. Price $7.50.

Scientific Research in Britain

A more cheerful note than has been apparent for some years is sounded by the Advisory Council of the Department of Scientific and Industrial Research in their report for 1952-53. A plan has been agreed for the substantial growth of the Department over the next five years whereby staff will be increased and additional funds to meet this, and for other purposes, will be made available, the broad effect of which will be to bring the Department's post-war plans nearly to completion by 1959.

THE report contains summary reviews of the work carried out by the research organisations of the Department and includes many relevant references to the literature.

The main objectives of the Food Investigation Organisation are: (1) to add to basic knowledge of the properties and behaviour of foodstuffs; this requires continuing fundamental research. (2) To carry out experiments and surveys for the purpose of providing, improving, and testing technical solutions to specific practical problems in food preservation; in this, close contact is maintained with industry.

Meat Investigations

Quality in frozen beef is being investigated in co-operation with the Commonwealth Scientific and Industrial Research Organisation in Australia. A survey of Australian beef carcasses arriving in this country suggested that the quality of a muscle improves during the fattening of an animal, the frozen muscle tends to "drip" less when it is thawed. Differences in the amount of "drip" cannot, however, be accounted for entirely by variations in quality of the carcass. After the death of an animal, the muscular tissues undergo rapid changes, the extent of which profoundly affects their behaviour when they are frozen and thawed or cooked. Changes which occur before *rigor mortis* sets in may also affect the amount of "drip" formed when a frozen tissue is thawed.

Work on the freezing of beef carcasses at different stages of *rigor mortis* is now being carried out at the Queensland Meat Board's abattoir in Brisbane by scientists attached to the Division of Food Preservation and Transport of the C.S.I.R.O., Australia, and the Department's Food Investigation Organisation. At the same time, laboratory work on the physiology and biochemistry of *rigor mortis* in muscular tissue continues at the Low Temperature Research Station, Cambridge. It has been found that adenosinetriphosphate and a protein, which is stable at 32°F. for at least 10 days, play a major part in changes *post mortem*.

In pork and bacon, quality may be affected by the diet of the pig and by the composition of the carcass, as well as by the breed of pig. The selection of breeding stock to give high quality pork and bacon may be facilitated by X-ray examination of the live animal. With young pigs, the number of vertebrae and ribs can be seen, and with older pigs, the thickness of subcutaneous fatty tissue can be measured.

In the smoking of bacon, the performance of the traditional smokehouse depends upon the acquired skill of the operator. By using special equipment for controlling air flow, temperature, humidity, and concentration of smoke, the smoking process can be carried out more efficiently and quickly, and the quality of the smoked product can be improved. In co-operation with industry, the methods of smoking at present employed are being examined, in order to determine the optimum conditions for a satisfactory smoke cure.

Eggs and Poultry

The results of laboratory work are applied in industry in co-operation with the Ministry of Agriculture and Fisheries, representing the producers, and the Ministry of Food, representing distributors and users. Standards of quality for eggs and methods of controlling quality for packaging materials are being sought. Wastage surveys have confirmed that the washing of eggs on the farm has an adverse effect on the subsequent storage life of the egg. The method developed for dipping eggs in oil before storage, to prevent evaporation of water, has now become an established trade practice. The extent of wastage owing to cracks in both home-produced and imported shell eggs is now being investigated.

During storage, certain physico-chemical changes take place in eggs. Experiments have shown that the amount of phosphate, amino nitrogen, and carboxyl groups in the white is directly related to the age of the eggs. This relation is consistent, on the basis of diffusion from yolk to white, with the large excess of these constituents in the yolk. The thick white of the egg becomes gradually thinner or more liquid during storage; the enzyme lysozyme may be concerned in this process. It has been demonstrated that thinning of the white is caused by a dissolution of the substance of the gel and a weakening of its structural components.

There is an increasing interest in the production and storage of table poultry. A programme of work on the subject has been initiated in co-operation with the trade and executive Ministries.

Fish Research

At the Torry Research Station, a pilot-scale, vertical plate freezer has been designed, which might be suitable for installation on existing vessels. Since the rate of catching is variable, and the space available for freezing aboard ship is severely limited, fish may have to be held in ice for a time before they can be frozen. Experiments have shown that the quality of the fish need not be affected by hold-

ing in ice for at least three days, while regulating supplies to the freezing unit. Fish which are to be frozen should be gutted and washed, according to the normal trawler procedure; if the fish is frozen ungutted, the product is inferior. Storage in ice before freezing accentuates the advantages of storing the frozen fish at very low temperatures, *e.g.* −22°F., and, conversely, the use of a lower storage temperature permits greater latitude in the pre-freezing conditions.

At different rates of freezing, the effect of ice formation on cell structure in fish appears to be a complicated one. In order to investigate this, a new air-blast freezer has been built, in which many of the factors which affect the rate of freezing can be controlled. Research on the effect of these variable factors is expected to lead to reliable data for design purposes.

Fruits and Vegetables

At the Ditton Laboratory in Kent, the optimum conditions for the storage of apples, pears, plums, and other fruits and for the storage of vegetables continue to be investigated.

To meet the demand for dessert apples during the winter and spring, late varieties of apple, which will yield heavy and reliable crops, with good keeping quality, are required. Trials have indicated that the variety Merton Prolific has excellent keeping quality, while a number of other varieties of dessert apple which can be grown in England can be kept until the late spring without serious losses.

The quality of perishable foods such as fruits and vegetables can best be maintained at suitable low temperatures. Unfortunately, cold storage facilities are not always available. A mobile refrigerated store, with a capacity of about 600 cu. ft., has now been designed and built. It is being used for precooling strawberries, raspberries, and plums, immediately after harvest, in order to improve the keeping quality of the products during and after transport, and for storing Cornish broccoli and spring cabbage. This mobile cold store can be towed to any part of the country, and has recently been used in various producing areas in England and Scotland.

The quality of many vegetables deteriorates fairly rapidly during storage and transport by methods normally used in the trade. Surveys are being carried out to determine the nature and extent of the wastage which occurs during marketing, and to develop methods of reducing and delaying deterioration. The effects of mechanical washing on subsequent wastage are being investigated.

Dehydration of Food

Practical tests, on a laboratory scale, of methods and equipment for dehydrating particular products are in progress, and studies of the chemical reactions which take place in vegetable and animal tissues during dehydration are proceeding.

A small drying tunnel has been constructed for work on the air-drying of fish. In this tunnel, conditions can be automatically controlled, and variable factors can be recorded by photography. The times required for drying have been found to be virtually independent of relative humidity in the range of 25 to 70 per cent. but they increase at higher humidities.

As a means of utilising surplus plums, there has been considerable interest in the possibilities of successfully drying them. It has been found that initial drying is better at 104°F. than at about 158°F. This is because drying at a lower temperature causes a greater loss of natural colour and of acid, and hence a sweeter and darker prune.

A serious defect of dried vegetables is their tendency to turn brown during storage under warm conditions. The constituents of the vegetable tissue which take part in this reaction (non-enzymic browning) are being sought. The browning appears to be caused by water-soluble constituents, and is probably a reaction between a neutral fraction containing sugars and a fraction containing amino acids.

Unexpectedly, a similar reaction was found to occur in dehydrated meat. Hitherto there has been no reason to suppose that reducing sugars were present in carcass meat. Free glucose has now been shown to be present.

Basic Research

Most of the work so far described has been concerned with practical problems of food technology; but before a solution can be found to many of these problems, much basic research may have to be carried out. The following are a few examples of work in progress.

Reference has already been made to studies of *rigor mortis* in muscular tissue, and their bearing on quality in meat. Also, since the connective tissue in meat affects its texture, the properties of the proteins of connective tissue are being examined chemically and physically, and the structure of the fibrous protein, as it exists in tissues, is being elucidated. To understand the chemical and physical changes which take place in fish during processing, the lipids, proteins, and soluble extractives of fish flesh need to be isolated and identified and their properties studied. Similarly, the various polyphenols in wood smoke must be isolated and identified before the bacteriostatic and antioxidant properties of the smoke can be investigated; the chemistry of wood smoke is being studied.

Changes which take place in stored fruits and vegetables present different problems, since these are changes in living tissues. Studies of the respiration of Cox's Orange Pippin apples over a six-year period have shown that there are seasonal fluctuations in respiratory activity, which may prove to have a bearing on seasonal fluctuations in keeping quality. During storage, certain volatile substances are evolved by fruits, and the nature and amount of these volatile substances in the atmosphere may affect the storage life of the fruits and development of the physiological disorders to which they are subject. The volatile substances produced by apples during storage are being identified and estimated.

The acids present in fruits are

concerned in the metabolic changes which occur during growth and storage, as well as contributing to the flavour. Various organic acids (such as quinic acid and chlorogenic acid) and amino acids present in the flesh and peel of apples are being isolated and identified.

Studies are being made of the chemical substances which are responsible for the browning, caused by the action of certain enzymes, which occurs when some living plant tissues are injured. In apples, leuco-anthocyanins and catechins are the principal polyphenols concerned in the formation of the brown pigments, and in pears, glucosides of coumarins, and flavonols. Chlorogenic acid occurs in both apples and pears. The action of the enzyme polyphenolase upon these constituents is being investigated. The leuco-anthocyanins have been identified as constituents of the "tannin" fraction of foods. These substances contribute to the astringent taste of the fruits and vegetables in which they occur; their chemistry, and their systematic distribution in plants, are being studied.

For some years, the mechanism by which ascorbic acid (vitamin C) is produced and destroyed has been investigated. For the first time, it is now possible to specify the probable chain of reactions which occurs during the synthesis of ascorbic acid in plants, and also in animals.

A survey is being made of the ascorbic acid content of the chief herbage plants, with the object of finding a material from which naturally occurring ascorbic acid could be recovered cheaply and efficiently.

Pest Infestation Research

The work of the Laboratory continues to be directed mainly to the study of the insects that attack and destroy stored foodstuffs and to the development of methods for their control.

It has long been known that insects infesting grain may be killed if the grain is stored under air-tight conditions, but it has usually been stipulated that grain intended for such storage should have a low moisture content.

The conditions of air-tight storage in France were inspected during the year in collaboration with the Ministry of Agriculture and Fisheries. Recently, in France, grain of relatively high moisture content has been successfully stored for several months in air-tight silos. This development has been made largely on an empirical basis without an adequate background of scientific knowledge concerning the physiological responses of normally damp grain and of its associated micro-organisms under conditions of anaerobic storage.

If successful, this method would be of considerable importance in Britain, since it would make it possible for grain of high moisture content, as normally harvested by combine in this country, to be stored in safety, thus postponing or even obviating the need for drying. The Laboratory is therefore making a detailed scientific investigation of the method. Work has begun on a laboratory scale and will later be extended to a semi-commercial scale.

Control of Blowflies in Refuse

An analysis has been made of the results of the 1951 experiments at the railway sidings where refuse is collected and sorted in North London. It was estimated from soil samples that, at one time during the height of the season, there were some 25,000,000 blowfly larvae in 15,000 sq. ft. of ground covered by tracks. The aim of the experiments was to prevent such larvae from developing into adult flies which could fly away and infest the surrounding districts. Trapping on untreated plots showed that the normal emergence of adult flies from the area would have been about 100,000 per day.

By treating the ground with various formulations of DDT and BHC it was found that some control was obtained at larval, pupal, and emerging adult stages. When compared on an equal cost basis, dusts were more effective than emulsions and DDT was better than BHC. The most effective treatment was a twice-weekly application of 5 per cent. DDT dust which gave an overall control of more than 99 per cent. Recommendations, based on the results of the experiments, were adopted in their entirety by the Borough Council concerned and, for a total cost of about £100, emergence of flies from the area was virtually prevented during 1952.

The importance of these findings is emphasised by the results of an examination of two large tips where refuse from London is deposited after transport by rail to a rural area. It was found that larvae were falling from the trucks at the beginning and end of the journey and that the refuse was still heavily infested on arrival at the rural tip. It is reasonable to assume that larvae were distributed along the track for the entire journey from London.

Vacuum Fumigation Techniques

In continuing the programme of investigation of different methods of "reduced pressure fumigation," a series of tests has been carried out with bagged wheatfeed using methyl bromide as the fumigant. The behaviour of the fumigant during tests was studied by determining gas concentrations in the free space and at different depths within the produce. Each test was carried out on a single bag in a chamber of about 1,700 litres capacity in a room controlled at 15°C. and 70 per cent. relative humidity.

The technique in which air and fumigant gas are introduced into the evacuated chamber simultaneously through a mixing valve until the pressure approaches atmospheric, was found to be no more effective for this commodity than fumigation at atmospheric pressure. The method in which the fumigant is introduced into the evacuated chamber and the pressure is then immediately brought to atmospheric was shown to be slightly more effective than the atmospheric method. A very much more effective penetration of gas into the bulk was obtained in the method in which the fumigant is introduced into the evacuated chamber and a low pressure (about 7 cm. Hg) sustained over a period.

Small scale experiments in which methyl bromide gas was

allowed to diffuse through a column of wheatfeed from a reservoir maintained at a constant concentration have been carried out at different pressures and it has been shown that when air is removed from the interstitial space fumigant diffuses much more rapidly through the column. Parallel tests with hydrogen cyanide and carbon dioxide have shown a relationship between rate of penetration and sorption of the gas.

This rapid penetration through the column at low pressures accords with the rapid attainment of high concentrations of fumigant in the bagged wheatfeed during the "sustained vacuum" tests. On releasing the "vacuum" even higher concentrations of gas were obtained in the bulk, further increasing the efficiency of the method. Subsequent tests showed that these high concentrations could be obtained in the centre of the bags by breaking the vacuum quite early in the experiment; optimum concentration-time products for a four hour period were obtained under the conditions of the tests when the vacuum was released after one hour.

Further experimental fumigations have been carried out using bagged whalemeat and bone meal, a comparatively dense and finely divided product containing about 50 per cent. protein. The large amounts of methyl bromide sorbed by this commodity make fumigation in a short period at atmospheric pressure impractical since penetration to the centre of the bags is extremely slow. Satisfactory penetration has been obtained using the "sustained vacuum" method. Amounts of methyl bromide combining with the product have been determined.

Methyl Bromide Residues

Methyl bromide is commonly used as a fumigant for foodstuffs, and although feeding tests, etc., have shown that there is no detectable harmful effect on foodstuffs so treated, it was nevertheless desirable to know the precise nature of the products of reaction between methyl bromide and, in this instance, wheat, during fumigation.

Use has been made of "labelled" methyl bromide, the carbon atom of which has been made radioactive. As the reaction is one of methylation, the products themselves contain the radioactive carbon and thus become detectable by their radioactivity.

Earlier work had shown that the greater part of the methylation occurred with the wheat protein and about half of this with the amino acid constituents of the protein which contained oxygen and sulphur groups. The remainder of the reaction occurred with the nitrogen-containing groups of the amino acids.

Attention was directed to the identification of the N-methylated compounds. Hydrolysis of the fumigated wheat protein with hydriodic acid caused the protein to be broken down into its individual amino acids, while any oxygen and sulphur methylated groups were split off as methyl iodide. The N-methylated amino acids were quite stable under these conditions and examination of such a "hydrolysate" by chromatographic methods showed that only three such compounds had been formed out of the many hundreds that were possible. Subsequent work has shown that all three appear to be methylated derivatives of the basic amino acid, histidine.

Work of Research Associations

Appended to the report of the Advisory Council is a summary of the work carried out by the various Research Associations. Among these is the British Baking Industries Research Association who have devoted considerable attention to the preparation of data on emulsifying agents for presentation to the Preservatives Sub-Committee of the Food Standards Committee of the Ministry of Food.

This work and the flour improver problem have involved the diversion of much effort from other topics; nevertheless, it has been possible to extend, to some extent, fundamental research. This has been concerned with natural oils in flour and bread, mechanism of the crumb softening action, flour and dough testing, bread ingredients and manufacture, purity of mineral oils in greasing operations, emulsifying agents in cakes, biscuits, and other products, and the prevention of mould and bacterial development in bakery products.

The year that has elapsed since the Fruit and Vegetable Canning and Quick Freezing Research Association took over the work of the University of Bristol Research Station at Chipping Campden has been one of internal reorganisation. A Research Committee has been formed, with three advisory panels—on canning, quick freezing, and engineering respectively—and it is through the work of these panels that contact is kept with the scientists and technologists in the canning and quick freezing industries.

A start has been made on the re-equipment and modernisation of the laboratories while the scientific staff has been augmented.

The number of technical enquiries dealt with during the year, and the number of visits paid by members of the staff to canning and quick freezing factories have been fully maintained, and the quality inspection of canned fruits and vegetables, a service given by the Research Station to the industry for many years, has been continued.

The decontrol of the milling industry has raised a number of technical and practical problems which have led to investigations of an advisory nature by the Research Association of British Flour Millers. These have centred mainly (i) on the possibility of obtaining, in white flour milling, a flour made on the divide system which would be equivalent to straight run 80 per cent. flour in both nutritional and baking quality and (ii) on the technical problems associated with the addition of enrichment mixtures containing vitamins and minerals to the lower extraction flours.

Other research has been directed to the moisture content of grain, flour improvers, biochemistry of wheat, oats and oat products, and sorghum meal.

The programme of research of the British Food Manufacturing Industries Research Association is

(Continued on page 230)

Hygiene in Meat Manufacture

Osman Jones, F.R.I.C.

In this article, the author describes the different ways by which meat products can be contaminated by bacteria, and the procedures to be adopted in their manufacture to ensure that the final products are free from such contamination.

MANUFACTURED meats may be roughly divided into four classes: (i) Those which in their completed state are in hermetically sealed containers, for example, cans and glasses, and which in the process of preparation subsequent to sealing have been subjected to a sufficient degree of heat treatment to arrest all bacterial activity. This class of product does not call for much comment, although it has been shown that the greater the amount of bacterial contamination prior to canning, the more difficult it becomes to produce a satisfactory product. Goods so packed are intended to keep their condition for an indefinite time, and if the heat treatment is insufficient or the bacterial contamination too heavy, the product is rendered unfit for consumption.

(ii) Fresh meat products intended for cooking by the purchaser, and not destined for long keeping, for example, fresh sausages. On account of their perishable nature, they are the only meat product in which the use of sulphur dioxide preservative is permitted. In many samples examined, the bacterial count is exceedingly high, frequently amounting to millions per g., not of very great importance because the sausages will be cooked before consumption, but a possible source of danger in cases where the cooking is insufficient.

(iii) Those meat products which are only partially cooked in the course of manufacture and then quick-frozen, the final cooking being completed after purchase by the consumer. There is some evidence that such preparations may possibly cause food poisoning.

(iv) Those articles which are intended for quick consumption, for example, brawns, pressed meats, and luncheon sausages. These products are cooked in the factory and subsequently sold in open containers, in slab form or in casings. These meats constitute the most frequent cause of food poisoning.

In classes (ii), (iii), and (iv), the method of handling, the initial degree of contamination, and the manner of exposure after preparation are all important.

Meat for Fresh Sausages

The hygienic state of fresh sausages is dependent upon the degree of contamination carried by the raw materials prior to manufacture, the manner in which they are handled during the course of manufacture, and their treatment subsequent to leaving the manufacturers' premises.

An operative completes the flaying operation.

In those factories where the meat used in sausages is derived from animals slaughtered on the premises, its cleanliness is largely a matter of careful control, and there is no reason why its bacterial contamination should be other than very slight. Cleanliness of the utensils used in its preparation, of the clothing worn by the employees, and their personal cleanliness are essential.

A frequent cause of unnecessary infection is lack of skill on the part of the butchers whereby the contents of the viscera, including the intestines, are allowed to come into contact with the flesh intended for human consumption. The number of abattoirs in which sufficient attention is given to these points is far too few. The examination of meat when all these precautions are taken has shown that the amount of bacterial infection can be reduced to a negligible figure.

Cleanliness in the Slaughterhouse

To achieve a reasonable degree of cleanliness, the slaughterhouse personnel should be dressed in uniforms of a white or light colour so that any contact with dirt or other substance capable of carrying infection or encouraging the growth of infection will quickly be visible. Clean uniforms should be provided once per day. Knives and hooks used for handling the meat should be sterilised frequently, if possible three or four times during a day's killing, and always at the end of a day's work and before commencing operations in the morning.

If during an operation it becomes necessary to wipe or clean a knife, after wiping on a clean cloth it should be dipped in hypochlorite solution. An article should never be picked up from the floor without subsequent cleaning.

There should be an invariable

The completion of the splitting process.

rule that whenever an employee uses the toilet, the hands should be thoroughly washed. Much of the contamination of the meat with *E. coli* has been shown to be due to handling the meat with unwashed hands. In particular, the condition of the finger nails should be given attention. When wiping the hands after washing, a communal towel is likely to undo the good work accomplished by the washing, and therefore individual towels should be provided; paper towels are available for the purpose.

Surface contamination frequently occurs as the result of hanging the carcasses in positions where they are exposed to dust laden air; as soon as possible after killing, the meat should be placed in a closed and chilled room. The meat should be kept chilled throughout its preparation, and all personnel engaged in handling it must have clean hands. All the plant and utensils with which it comes into contact must be subject to sterilisation.

Handling Allocated Meat

These are all practical precautions which can be taken in those premises where the hygienic control of the meat in its preparation is possible; but there are many manufacturers who do not carry out slaughtering operations, and so are dependent upon the quality of the meat at present allocated to them under the rationing scheme. Unfortunately this meat is, more often than not, in a very highly contaminated state upon arrival at the sausage makers' premises. Bacterial counts in excess of five million organisms per g. are common, the organisms including *E. coli*, coagulase positive micrococci, and *Str. faecalis*, all indicating unclean handling.

The meat comes from various sources, sometimes direct from a slaughterhouse, no adequate precautions being taken in its transit to avoid contamination, from cold store, or from chill rooms. It may have undergone long distance transport, during which initial contamination increases enormously. These conditions are beyond the control of the manufacturer, but some precautions can

The Meat Inspector inspects the offals hung in sets from the red offal rack for easy identification.

On the right the plucks are hung on the special carriers and on the left the sheep carcasses are transferred to star hooks in the pre-cooling room.

Photos: Government Experimental Slaughterhouse, Fareham.

be taken to improve the hygienic state of this class of meat before conversion into sausages.

If the meat arrives direct from a slaughterhouse, it should be thoroughly sprayed with a solution of sodium hypochlorite (1 part in 2,000 parts of water) and then chilled, without washing away the hypochlorite. This method is equally satisfactory with chilled meat. If the chilled meat is required for use as quickly as possible after arrival, one hour is a sufficient length of time to allow the meat to hang prior to use. It can be washed after that period, but only with clean water direct from a main supply.

Defrosting Frozen Meat

Frozen meat should be defrosted by immersion in water containing 10 parts per million of chlorine. In the larger establishments, defrosting can be carried out with advantage in a tank of running water, thermostatically controlled and fitted with a chlorinator. The temperature of the inflowing water should be about 80°F. Under these conditions, complete defrosting can be achieved in less than 12 hours, the time depending upon the size of the pieces of meat being dealt with. For example, a pig's carcass, the internal temperature of which is 10°F. at the centre of the thickest part, will reach 32°F. in approximately eight hours.

This treatment with chlorine is highly effective because the bacterial contamination is almost entirely on the surface.

The defrosting of frozen meat by hanging it in the factory and allowing it gradually to thaw, which usually requires at least 36 hours, is a thoroughly bad practice. The bacterial contamination increases by millions per g. during the process.

Contamination of Casings

The skins or casings into which the sausage meat is filled may be natural or artificial. In the case of natural casings, at the time of removal from the animal, they will carry a high degree of bacterial infection. Much of this contamination can be removed by careful cleaning and washing. After this treatment, the skins are lightly cured in a weak brine and then packed in dry salt and left in that condition for some weeks to mature. The high salt concentration serves the purpose of inhibiting bacterial activity by destroying much of the flora. There are a few species of organism which withstand the high saline concentration, among them the halophils, and probably a few micrococci of a harmless nature. The skins, when required for use, are soaked in water and then threaded on to maundrels, ready for transfer to the sausage filling machine.

It is unusual for skins so prepared to arrive at the filler almost free from bacterial infection, because in the final handling they are likely to become infected with *E. coli* from the workers' hands and by other contaminants, such as micrococci. Infection with *E. coli* can be avoided by hygienic

handling. Casings should not therefore be regarded as a cause of heavy infection.

Artificial casings are cellulose preparations, and not prone to heavy infection.

Spices and Fillers

The spices used for flavouring are a frequent source of bacterial contamination. Quite a wide variety of micro-organisms have been isolated from them, such as coagulase positive micrococci (commonly known as *staphylococcus p. aureus*), *E. coli, Str. faecalis, B. subtilis,* etc. This source of contamination can be eliminated to a large extent by heating the spices at a temperature of 250°F. for a period of not less than 10 minutes. This leads to some slight loss of pungency, and an additional five to 10 per cent. of the spices should be used to compensate for the loss.

So long as it remains in a dry condition, the cereal filler, whether rusk, rice, or semolina, carries a low bacterial count. The rice and semolina are invariably cooked, which destroys the micro-organisms. The method of preparation of the rusk, which is roasted, ensures its freedom from bacteria, although not infrequently it contains some yeasts. Once soaked, it should be used quickly and not left standing around even for a few hours, as it rapidly develops a high bacterial count.

If all the ingredients are comparatively free from contamination, the machinery (particularly the chopping and filling machinery) is clean, and the workers' hands in a like condition, sausages of very low bacterial count can be produced, for small amounts of contamination will be checked by the preservative. Close attention to all the foregoing details will almost double the fresh "life" of this kind of article.

Preparation of Pressed Meats

The preparation of pressed meats and articles of a similar nature calls for special precautions. The usual method of procedure consists in cooking the de-boned meat in open vessels, removing it, and allowing its temperature to drop until it can be handled. At this stage, it is given a further trimming to remove connective tissues and then packed into metal moulds. Gelatine solution is then added and the product put to cool, preferably in a chill room.

The handling after cooking causes heavy contamination which rapidly increases, encouraged by the warm meat. A further cause of infection is likely to be caused by the gelatine solution, which if allowed to cool below the thermal death-point of bacteria becomes an ideal medium for microbiological propagation.

Bacterial counts for this type of preparation are illuminating, the counts being made upon nutrient agar plates at 37°C.

The average figures taken for 108 samples are:

External sample	*Internal sample*
Exceeding 5,000,000 per g.	Between three and four million per g.

The flora in the majority of the samples consisted largely of the usual types, micrococci, sometimes coagulase positive, *E. coli, Str. faecalis*, and the common putrefactive types, *e.g. B. subtilis*.

It has been found that even when great precautions are taken, heavy contamination nearly always occurs. In order to improve the unhygienic condition of these ready cooked meat packs, care should be taken that after filling the moulds with the meat and adding the gelatine solution, the mould containing the meat be transferred to a steam-heated retort, in which it is subjected to a temperature of at least 215°F. for a sufficient period to permit the pack at the centre to reach 180°F. The time required will differ according to the size of the mould, but is unlikely to be less than 45 minutes. This re-heating does not preclude the necessity for taking precautions in the treatment of the gelatine solution, which must be maintained at boiling point (212°F.) when in use.

The final cooking of the pressed meat has a most marked effect upon its bacterial content. A great number of samples examined showed that the external count seldom exceeds 100 organisms per g., and the internal count between 10 and 20.

A possible objection to this method is the danger of overcooking the product, with a consequent deterioration of its palatability, and it may be desirable to reduce the length of time of precooking so that the total time of cooking is the same as it would be if the retorting had been omitted.

If the above precautions are taken, and the finished product cooled in a chill room in which the air supply is filtered, the hygienic condition of the meat will be satisfactory, provided the meat is not touched by hand during packing.

This type of product is becoming more and more popular. Properly controlled during manufacture, it can be a safe food if adequate regulations are made for its treatment by retailers.

Scientific Research in Britain

(*Continued from page 226*)

balanced to cover the interests of the various sections of the membership, grouped according to their particular manufacturing interests. Work is in hand on some 48 subjects, ranging from long-term fundamental investigations to immediate practical problems bearing on the preparation, processing, and marketing of foods.

Some of the current lines of investigation have been concerned with bakers' prepared materials, cocoa, chocolate, and sugar confectionery, jam, margarine and compound cooking fats, meat and fish products, and pickles and sauces.

The Leonard Hill Technical Group

Articles published in some of our associate journals in the Leonard Hill Technical Group this month include:

World Crops.—Increasing the World's Food Supply; Mechanical Handling.

Manufacturing Chemist.—Bromine from Sea Water Plant in Anglesey.

Corrosion Technology. — Prevention of Corrosion by Water.

Some Dutch Microbiological Food Spoilage Problems

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It is not the most dominant types of micro-organisms responsible for the spoilage of fresh and preserved foods that present many serious problems to the food technologist or the microbiologist, but rather those micro-organisms which are capable of developing under extreme conditions. The latter types are discussed by the author in relation to the food industry in the Netherlands.

MICROBIOLOGICAL spoilage occurring in unprocessed foods when stored at or above freezing temperatures can be sufficiently retarded by practices regularly applied in the food industry. The spoilage problems which still remain a challenge to the microbiologist, however, are those caused by micro-organisms capable of developing under extreme conditions. The most important types of these organisms are summarised in Table 1.

The foods involved in spoilage caused by such organisms are mainly candied fruits, salted herring, margarine, canned meats and fish, and processed cheese.

Osmophilic Spoilage of Candied Fruits

Two samples of candied fruit, in which gas formation had occurred, were examined.[1] It was the second reported outbreak of osmophilic fermentation in the Netherlands.[2] The fruits contained about 70 per cent. by weight of total solids (among which were 30 per cent. of sucrose and 25 per cent. of hexoses) corresponding to an equilibrium humidity of 0·81, the *p*H varying from 3·7 to 4·2.

From the fruits a strain of the osmophilic yeast *Saccharomyces rouxii* Boutroux was isolated, which was shown to be present in the order of 10^4 cells/g. of the candied fruits. The strain did not ferment, although it showed growth in sucrose solutions. It completely fermented 70 per cent. by weight levulose in 0·5 per cent. yeast extract in 25 days at 30°C.

The same strain was isolated from the molasses used in the preparation of the product. The osmophilic yeast was also found in bees flying on the premises of the factory where the candied fruits were made, thus confirming the older evidence that insects may be responsible for the contamination of concentrated saccharine foods with osmophilic yeasts.[3]

Successful prevention of new outbreaks of this type of spoilage was obtained by subjecting the commodities to adequate pasteurisation and preventing their reinfection by proper sanitation and exclusion of insects.

Red Discoloration in Salted Fish

In 1932, Miss H. F. M. Petter, working at Utrecht University Botany School, studied halophilic rods and cocci isolated from locally reddened salted fish.[4] Her observations were confirmed by the present author in an outbreak of red discoloration in salted cod, shipped from the Netherlands to the West Indies. In isolating the causative organisms a medium containing 23 per cent. by weight sodium chloride and both fish solubles[5] and milk solids[6] as nutrient supplies appeared to be very effective.

In September, 1951, a case of the diffuse red discoloration in barrelled herring in brine—the type first described in the Netherlands by Liebert in 1930[5]—was studied. Although halophilic sarcinae could be isolated from the reddened herring and brine, it was considered highly unlikely that these cocci were the cause of the discoloration since the same level (10/100 g.) of contamination was found in salted herrings obtained from normal barrels of herring in the same shipment.[7]

Lipolytic Spoilage of Margarine

Owing to economic factors, margarine in the Netherlands is mostly prepared from coconut, palm, and hydrogenated whale oils. Whereas a slight microbial lipolysis is not organoleptically detectable in American margarines (prepared from hydrogenated soybean and cottonseed oils), the same phenomenon in Dutch margarines gives rise to the liberation of the evil-smelling lower fatty acids ($<C_{12}$) present in coconut and palm kernel oil and is therefore detrimental to the quality of the pack. The frequency of this type of spoilage is further increased because, as a rule, Dutch

TABLE 1

External factor involved	*Numerical value, normally inhibitive*	*Micro-organisms, not inhibited by values of Col. 2*
Temperature	T_m = + 2°C. T_M = 50°C.	Psychrophilic rods. Thermophilic spore-formers.
Equilibrium humidity	h = 0·75	1. Halophilic bacteria 2. Osmophilic yeasts 3. Xerophilic moulds
Acidity	*p*H = 3	Acid tolerant moulds, yeasts, Gram-positive rods and sarcinae.
Anti-microbial agents	Synthetic, or present in spices, onions, egg-white, (aged) lipids.	Special, tolerant strains, *e.g. Margarinomyces* sp. breaking down benzoic acid.
Heat treatment	Θ_s(121°C., *p*H=6-7)=4 min.	Thermo-resistant spore-formers or fat-protected spore-formers and cocci.

Abstract of a lecture presented at the Bacteriology Seminar, University of Texas.

margarine cannot be stored under refrigeration because of the lack of the necessary facilities.

Investigations were started to find out whether rigid sanitation could prevent the entrance of lipolytic bacteria, yeasts, and moulds. Confirming the earlier observations of Jacobsen in the Netherlands[8] and of Stokoe in Great Britain,[9] it appeared to be impossible to maintain total counts in margarines containing milk solids below the order of 10/100 g.

As a consequence, the effect of the application of benzoic acid (which is permitted in the Netherlands in concentrations up to 0·2 per cent.) was studied. It was demonstrated that these levels of benzoic acid substantially inhibited lipolytic spoilage when the *p*H of the aqueous phase of the margarine was reduced to values of *p*H <5 in order to allow for an effective concentration of benzoic acid molecules.[10] The evidence that only undissociated benzoic acid shows antimicrobial properties was presented by the Dutch worker Vermast as early as 1921;[11] today it is felt that this is due to a lack of ability of the electrically charged benzoate ions to diffuse into the microbial protoplasm.[12]

Canned Non-acid Foods

The canning of non-acid foods rich in fat presents another extremely interesting field of study of highly tolerant micro-organisms.

The types of organism involved in the spoilage of canned foods in general are:

1. Asporogenous micro-organisms and spore-formers, including *Cl. botulinum*, showing a moderate standard heat resistance, *i.e.* not surpassing the order of 10 min./115°C., or 4 min./121°C. at *p*H 6·0 to 7·0.[13, 14]

2. Spore-formers, *e.g.* the thermophiles, having a considerably higher heat resistance.

3. Micro-organisms of group 1, *e.g. Cl. botulinum*[15] and micrococci[16, 17] which, because of local absence of moisture owing to inclusion in fat,[18, 19, 20] show heat resistance values of the same order as those found for the bacteria of group 2.

The aim of canning should always be to obtain a sterile pack.[14, 21] This can be easily achieved in acid foods, such as fruits, where heat resistance values of micro-organisms are low. In non-acid foods poor in lipoids, such as vegetables, sterility can be attained by proper processing (taking care of the micro-organisms of group 1) in combination with adequate plant sanitation and bacteriological control of raw materials, such as flour, sugar, and spices, thus avoiding the entrance to the commodities of the bacteria of group 2.

In a few commodities rich in fat, however, owing to the presence of organisms of group 3, it is not always possible to reach sterility without seriously impairing the organoleptic quality. It is felt that the future approach to this problem should nevertheless not detract from the general requirements for canned foods:

1. Absence of any public health hazard.

2. Stability, *i.e.* absence of physical, chemical, or organoleptical changes, other than those which can be expected to occur owing to chemical reactions, after incubation for three to four weeks at 25° to 37°C. and seven to 10 days at 50° to 55°C.

3. A limit for the numbers of live micro-organisms found in the pack after incubation. If this number surpasses the order of 1/g. while the product is stable, the situation is referred to as "commercial sterility."[22]

Meat Products

The results of a number of investigations suggest that meat and fatty fish packs may contain numbers of live micro-organisms of the order of 10/g. and still be perfectly safe.[16, 23, 24, 25, 26, 27, 28]

It appears that the surviving spores in those cases are unable to germinate and spoil the pack because of certain unfavourable circumstances, *e.g.* limiting sodium chloride[29, 30, 31] or nitrite content[32, 33] and/or the presence of peroxidic lipids.[34, 35] Recent evidence suggests that on prolonged storage such surviving spores may even die.[33]

Hence, although for non-cured non-acid products, such as vegetables, a strict adoption of the established *Cl. botulinum*—safe processes[13, 36] should be compulsory, it may be that for products such as cured meats and vegetable-meat combinations a slightly less severe heat treatment may be safe,[37] provided the sanitation in the plants and the effectiveness of the curing process are adequate. It should be realised, however, that under such circumstances it will always be possible for spoilage to occur by reason of the development of sodium chloride and/or nitrite-resistant spore-formers. An actual case of this type was reported in the Netherlands by Verhoeven,[38] who recently isolated from swelled canned ham a strain of a thermophilic *B. subtilis*-like spore-former capable of reducing nitrite to N_2O+N_2.

Processed Cheese

Another product which cannot be sterilised without denaturation is canned processed cheese. It seems that the commercial procedures adopted for processing this product could be tentatively maintained provided (*a*) the bacteriological quality of the cheese used as a raw material is high, and (*b*) the *p*H and salt content of the final product are adjusted within a suitable range.[39]

Recent research carried out in Great Britain suggests that the application of starters containing strains of *Str. lactis* which produce the antibiotic *nisin* may provide another solution to the preparation of stable processed cheese packs, since this antibiotic appears to be an extremely potent inhibitor of the gas-forming anaerobic spore-formers which most frequently spoil this type of product.[40, 41]

Before the commercial sterility of such special products can be adopted or even proposed as a standard, however, more long-term storage experiments of the type already completed in one instance[33] should be carried out with numerous test lots, conforming to the proposed requirements.

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Indian Research Developments

Two processing techniques have recently been evolved at the Central Food Technological Institute, Mysore, India. One is concerned with the extraction of starch from the stems of the banana plant, and the other with the utilisation of certain varieties of loose jacketed oranges in the production of fruit juice.

In the case of the former process, investigations to find a suitable substitute for maize revealed the possibility of the use of banana stems. By proper processing, these were found to yield from one and a half to seven pounds of starch for each stem, depending on its size. After reducing the stems to a pulp in a grinder, the pulp is soaked in a dilute solution of sulphur dioxide. The addition of further water separates the fibrous portion of the pulp, while the starch particles are allowed to settle in specially prepared beds.

Research carried out with the juice of the loose jacketed varieties of orange grown extensively in the hilly regions of different parts of India showed that its bitterness could be almost completely removed by treating the segments in boiling dilute lye solution to remove their outer covering prior to extraction of the juice. Although this process slightly lowers the yield of juice, it has the advantage of removing some of the pectic substances which often lead to gelation, thus ensuring better clarification of juice concentrates. These experiments should lead to a greater demand for this type of orange and enable it to compete with the juice of the Sathgudi orange, highly priced in Madras State.

FUTURE ARTICLES

Among the articles to be published in forthcoming issues of Food Manufacture are the following: A description of a gelatin factory, "Progress with Quaternary Ammonium Compounds," "The Manufacture of Active Dried Yeast," and "Pilot Plant Production of a Milk Substitute from Groundnuts."

Industrial Sterilisation

At the recent symposium on industrial methods of sterilisation organised jointly by the Society for Applied Bacteriology and the Microbiology Group of the Society of Chemical Industry, four papers were presented, short abstracts of which are given below.

Sterilisation with ozone was the subject of the paper read by Dr. M. Ingram (Cambridge), who pointed out that the disinfecting action of ozone was not understood, but it was known that it produced ozonides which in turn hydrolysed, giving rise to acid products; it also reacted with amino acids to produce aldehydes and hydrogen peroxide. The efficacy of disinfection was, therefore, dependent on the nature of the material to be treated, but exact information on the influence of various factors concerned was lacking, and much of that available was contradictory. The disinfection rate was exponential, but required minutes and not seconds as apparently was generally thought.

Relative humidity played an important part in air disinfection, increasing values above 50 per cent. resulting in increased activity. The presence of organic matter affected the rate of reaction, and a reciprocal time/concentration ratio appeared to obtain, provided an initial basic concentration of about 1 p.p.m. was allowed.

With solutions, the effect of *p*H was difficult to measure because of the acid products of reaction which themselves could inhibit bacterial growth. Different opinions were expressed on the effect of temperature, some authors stating that it was slight or negligible, while others found that reduction of temperature below 20°C. tended to give increased efficacy. These differences might possibly be due to impurities in the ozone or to products of ozone reaction. Depending on the method of manufacture, ozone might contain large amounts of nitrogen oxides, which could considerably enhance disinfecting efficiency.

Ozone was used in practice for disinfection of air, water, and for protection of food products, especially meats, but little or no penetration occurred and the effect was virtually only that of surface treatment.

Although the popular belief was that canned foods were virtually sterile, this was not true in practice, according to Mr. Osman Jones, who discussed "The Survival of Bacteria in Wholesome Canned Foods." He pointed out, for instance, that foods of low *p*H value were adequately preserved by a mild heating to kill moulds, any bacteria surviving being incapable of development owing to the acidity of the products. Meat products were seldom sterile in the proper sense. Up to 25 per cent. of certain canned meats had been found to contain bacteria, and Savage has put this figure in some cases as high as 100 per cent. Canned meats had been kept organoleptically sound for several years, although they contained viable bacteria. One of the most notable examples was that of a tin of meat brought back from the Parry Arctic expedition, which, on opening after 113 years, yielded six different strains of bacteria.

Pork had been inoculated with *Clostridium sporogenes* and, after heat treatment, had been stored at 37°C. for long periods without showing any deterioration, in spite of the survival of small numbers of the inoculated organisms. Sudden reactions had been known to take place after relatively long periods of storage, and these might be due to slow internal reactions such as nitrite-nitrate changes.

Environment affected considerably the heat resistance of bacteria, and spore-formers were found to be more resistant on cooked meat than on raw material, and again more resistant if protected by fats. The reason why organisms should remain dormant for long periods was, at present, obscure.

Discussing the "Sterilisation of Surgical Dressings," D. R. Maxwell Savage drew particular attention to the different properties of super-heated and super-saturated steams, stating that the former was inefficient as a sterilising agent unless the temperature was raised to that for normal dry-heat sterilisation. He illustrated diagrammatically how in steam autoclaves the normal sterilising temperature and pressure could be attained either by a saturated steam cycle (the normal method) or by a super-heated steam cycle, in which case sterilisation might not be properly achieved. Considerable care was necessary to eliminate air as far as possible, as this tended to give rise to "superheated" steam (owing to the reduced vapour pressure of the steam) and so reduced the efficiency of sterilisation. This presented certain difficulties owing to the tendency of the air to separate from the steam and layer, but adequate vents in the autoclave, both at the top and bottom of the autoclave, had eliminated this.

Mr. G. Sykes dealt mainly with the "Sterilisation of Air" as required on the large scale for antibiotic fermentations. He pointed out that sterilisation by chemical means was impracticable because of the danger of the carry-over of the disinfecting material into the fermentations, and also that heat treatment, although very efficient, was again impracticable on a large scale on economic grounds. Ultra-violet radiation was unsuitable because of its limited efficiency in terms of both time and of its inability to deal with bacterial spores and protected organisms. The precipitron, likewise, had not proved sufficiently effective in practice.

Mr. Sykes then discussed the various filter materials commonly used, and showed that both granular and fibrous materials could be used to good effect.

TO AUTHORS AND READERS

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Open Forum on Packaging Problems

A team of six experts on weighing, filling, capping, wrapping, cartoning, and labelling, consisting of members of the Packaging and Labelling Machinery Section of the Food Machinery Association occupied the platform at a recent meeting of the Southern Area of the Institute of Packaging, under the chairmanship of Mr. G. H. M. Rosam (National Chairman of the Institute). A summary of the observations of the individual members of the team and of the subsequent discussion is given in this abstract.

IN an introductory speech, Dr. E. H. T. Hoblyn, Director of the Food Machinery Association, briefly reviewed the growth of the Association and welcomed the co-operation which had developed with the Institute of Packaging since the Association's presentation of a paper on "The Mechanisation of Packaging" at the Convention at the last Packaging Exhibition.

Mr. W. Samson (Anker Bros. and Co.) said that he was convinced that co-operation was necessary in order to find the most suitable and economical means of satisfying the requirements of the user industry. Problems could not always be solved by correspondence, or even solely by discussion between individual firms. Far wider issues were often at stake. For this reason, he greatly favoured the activities of a technical committee of the Institute and especially welcomed the idea of forming discussion groups on specialised subjects. He had already attended the first discussion group on labelling, when several useful suggestions were made.

Weights and Measures Legislation

Mr. R. Wilson (Southall and Smith) referred to the effects of the Report of the Committee on Weights and Measures Legislation, commonly known as the Hodgson Report, published in 1951 and at present under consideration by the Government. The recommendations of the Report, if made effective, would have a material effect on Britain's packaging industry.

In order to clarify its implications, Mr. Wilson sketched its historical background. The principal controlling Act was the Weights and Measures Act of 1878, the mainspring of all subsequent legislation. In 1904, national control was put in the hands of the Board of Trade, and regulations were issued in 1907 which formed today's basis of control.

Between 1907 and 1954 all kinds of changes had taken place, *e.g.* the installation of self-indicating dial machines as standard equipment in shops, and the considerable development in automatic weighers with the introduction of electrical controls. Standard units, such as apothecary weights and measures, had been largely displaced by the metric system, and it had become necessary to review the whole position. The Hodgson Committee was set up to do this, and it was highly probable that the sequel to their 1951 Report would be a new Weights and Measures Act embodying some of the recommendations.

Part 3 of the Report, dealing with short weight and measure, was important. Up to 1926, the only offence under Weights and Measures law was that of giving short weight on coal and fuel. The Sale of Food Act, 1926, took care of the sale of food and, strictly speaking, if other commodities were handled, such as tintacks, action could not be taken under the Weights and Measures regulation. A prosecution would be necessary under the Merchandise Marks Act. One of the purposes of the Hodgson Report was to bring all weighed commodities under the same legislative umbrella. Another important aspect of the report was the extension of present retail controls by which a number of additional foods and certain household commodities, other than food, would be required to be sold by weight only, and when prepacked to be made up in specified weights only.

Wrapper Allowances

Another recommendation concerned a reduction in the wrapper allowances permitted to be included in the declared weight and a restriction in their use. Under the 1926 Act, the weight of certain scheduled foods purported to be sold might include the weight of the wrapper or container provided it did not exceed, in the case of bacon, ham, butter, lard, suet, and margarine, 2½ dr. per lb. of the article sold, or, in the case of sugar, rice, sago, and tapioca, 4½ dr. per lb. The Hodgson Committee came down heavily against what they described as "the violation of the principle of sale by net weight," and very briefly, and subject to certain exceptions, they urged that when goods were prepacked in a factory net weight should be insisted upon, but where the retailer still weighed his goods, it should remain permissible to include a small wrapper allowance.

A difficult point was the recommendation relating to volumetric fillers for powders, *i.e.* that volumetric fillers should be stamped in the same way as weighing machines. To this, the reply of the manufacturers of volumetric fillers could only be that it was impossible, as the output could vary from minute to minute, depending on such factors as density, moisture content, and composition. The net result might be to stiffen up the insistence on weighing instead of volumetric filling.

Labelling Machines

A brief survey of the types of labelling machines now available was given by Mr. G. Staniland (Purdy Machinery Co.). These machines started with the small semi-automatic, hand-fed type performing simple work on round

containers at 25-45 containers per minute. Then came the more elaborate semi-automatic hand-fed machine applying from one to three labels at the same time on normal containers of various shapes. They could also apply labels to many other articles, such as balls of wool, Christmas cards, and even Ludo and Snakes and Ladders boards.

Among the fully automatic machines were the type suitable for packaging-line operations at 65 containers per minute, such as were normally found in the food and spirit industries. The work performed varied from the simple single label to simultaneous back and front labelling of bottles of many shapes and sizes. The final stage in automatic machines was the larger type of unit which could apply body or body and shoulder labels at speeds ranging from 350 dozen to 1,750 dozen per hour. This class of machine was usually confined to the beer or mineral water trades. Smaller sizes of such machines were, however, often used for labelling jam jars and similar containers.

Basically, all labelling machines were manufactured as standard machines, varying jobs being performed by different sets of parts and attachments fitted to the same machine. Thus, a standard semi-automatic machine could be adapted for the labelling of a 1 c.c. ampoule of penicillin or a one gallon can of paint.

Consultation between user and machine maker, before the adoption of a new pack or label, could save considerable time and money, and produce a far more satisfactory result. A minor variation could often result in improving the appearance of an existing pack, and in its speed of production.

Filling Machinery

Mr. C. B. Harley (Gravfill) said that for nearly 25 years he had been concerned with the design and manufacture of machines to fill all kinds of still or uncarbonated liquids into bottles, ranging from a fraction of an ounce up to about 1 gallon, by gravity, vacuum or suction methods and, in some cases, pressurised air generated in the machine itself. He believed that the latter method would become more prevalent in the future.

With the two systems of filling, by measured volume or to an automatically controlled uniform height or level, up to the present, most requirements had been met by the latter method, but filling with a measured volume was coming more and more into favour, particularly in the pharmaceutical trades. In his view, the volumetric system would have to be used for both viscous and free flowing liquids which had hitherto been filled to a uniform height. The machines he had worked on ranged from simple bench models up to 16-head fully automatic rotary filling machines. Some machines had to be made so that no metal of any kind came into contact with the product, and in such cases plastics were proving useful.

In many cases, machines had to be linked up with cappers or labellers, and close collaboration was necessary between the respective manufacturers. In most cases, cappers and labellers had to be specially designed or adopted to suit each particular job, and the manufacturers required to have as much information as possible before tackling it.

Capping and Closing Machines

After introducing his own particular experiences concerning capping and closing machines, Mr. G. B. Sanderson (The Metal Box Co.) stressed the importance of the maintenance of such machinery. One of the trends he thought important was the vastly increased speed of all operations of filling, closing, labelling, casing, etc., on packing lines. Even in the past three years there had been a great increase in speeds, and this trend was by no means at an end. This had brought with it the very real problem of maintenance. It applied equally to other processing and packaging equipment used throughout industry.

A reasonable way of dealing with this was to institute a precise routine for internal lubrication and periodic inspection. A replacement programme was also something which had to be considered.

Wrapping and Cartoning

Summarising his own experience of wrapping and cartoning, Mr. H. J. Wenban (Foxgrove Machinery Co.) said that it generally concerned solid articles, regular or irregular in shape, and in particular in the sugar confectionery field, where there had been extensive developments in the last few years. As machines became more specialised, so they became less flexible. Higher speeds, new materials, heat sealing films, and so on, all necessitated individual consideration. There was also the modern trend of linking the wrapping with the producing process, *e.g.* in confectionery, modern machinery converted the mass of material into an extruded "rope" and fed that "rope" into the sizing, cutting, and wrapping unit. In cartoning, apart from machines for making up cartons quite separately from any other operation, there was also machinery which formed up the carton, inserted something into it, and finally closed it. Such machines were in the "tailor-made" class, devised to suit one particular article.

During the discussion which followed, it was asked whether vacuum packing produced an unfair strain on the seam of a tin or can and whether any alternative method of packing could be used to obviate this. Mr. Harley replied that when a liquid was filled into a can, the application of excessive vacuum would strain the seam. For example, when filling lubricating oil into a one gallon can, the can would collapse if suction of more than two or three inches were applied. If the can were cylindrical in shape, a higher degree of suction might be employed. One alternative method of filling a can to a uniform height by suction or vacuum was to employ gravity assisted by air pressure.

Another questioner asked what happened when the can was vacuumised and left under vacuum after filling. There were, he said, other methods of preserving the

contents of that tin. For instance, the inert gas pack.

Mr. Sanderson replied that the inert gas pack was not a vacuum pack, but it was necessary to draw a vacuum on the contents of the pack to introduce an inert gas. There should be a distinction between closing the container under vacuum and filling it under vacuum. In the latter widely used process, the vacuum produced was comparatively slight and did not put any strain on the container. It was when the container was closed under vacuum with a vacuum closing machine or in a stationary vacuum cabinet that the container could be severely strained. It was not necessary for this to happen because the container was designed for the purpose it was to serve, and should be made to suit the vacuum necessary for the process involved. Commercially, reasonable demands could be coped with by standard containers.

Permissible Tolerances

On the problem of maintenance of accuracy of filling, it was questioned whether these machines continued accurate over a long period. What tolerances and variations of weight could be expected from a machine weighing, say, 56 lb. or 1 cwt. over a reasonable run?

Mr. Wilson replied that, generally speaking, the following tolerances were permissible: When the machine was manufactured and stamped by the Weights and Measures Inspectorate, it was allowed ½ per cent. plus, and minus nothing. When it was again inspected in service, it was allowed twice that amount—1 per cent. in excess only. If the machine worked outside that limit, the inspector would cancel the stamp and order the machine to be overhauled and re-stamped to the first standard.

The length of time during which the machine could be kept within its tolerance depended upon the efficiency of its maintenance. Servicing was very important but, generally speaking, a high speed automatic weigher should not require to be serviced more than once every six months, depending on what was being handled. A machine working on icing sugar, for instance, would need to be serviced much more frequently, but with something like rice, it might go for several years without attention.

Problems with the Vacuum Pack

Another questioner asked why the so-called vacuum pack for coffee in a can appeared always to have a swelled rather than a collapsed end and appeared to be under pressure rather than under vacuum. Mr. Sanderson explained that coffee after grinding generated gas. If it were put in a can immediately after grinding it would continue to generate gas for about two days, which would cause the slightly swollen appearance. The only way it could be overcome was to allow the coffee to stand for a period before packing to allow the gas to escape.

Among a large number of other questions were those concerned with the co-operation which should exist between manufacturers of different machines in automatic lines by which it would be possible to ensure that the user had all his units running at one maximum speed; the machine coding of labels, and the use of direct litho printed tins *versus* labelled ones.

Concluding the discussion, Dr. Hoblyn explained some of the post-war difficulties of reconstruction and factory building which should be viewed against the high rate of demand for everything produced. On the need for co-operation, he said it would be very helpful if, instead of suddenly demanding a special machine, the customer would tell the machinery maker his plans when they were in the embryonic stage. This would help the machinery maker to look ahead, judge the trend of demand, and put him in a better position to help his customer.

Modern Yeast Production

THE technique of large scale yeast production has made enormous advances since 1920; the modern process is a pure culture one demanding strict chemical, physical, and biological control at all stages. Many of the lessons learnt are applicable to the newer fermentations and mass culture processes now in course of development, as well as to older allied industries such as brewing.

A recent book,* although primarily concerned with the manufacture of bakers' yeast, on which the author is an acknowledged authority, covers in its 32 chapters a very wide range.

In chapters two to six are given a detailed account of modern yeast manufacture, and in subsequent ones the effects of nutrilites, aeration, temperature, etc., are treated in fuller detail. It is interesting to read that yeast produces the same amount of carbon dioxide whether grown for alcohol production or for yeast crop; this suggests that the carbon used in yeast synthesis may pass through the alcohol stage.

Some of the facts discussed may seem surprising to brewers. For instance, in yeast manufacture copper vessels are not employed owing to their toxic effect, and bacterial infections increase tenfold at each propagation stage. Yet brewers commonly brew in copper-lined vats, and may carry on with the same pitching yeast for hundreds of fermentations. These and other apparent mysteries are explained in Mr. White's book. Chapter 17 on microbiological control may also be read with advantage by brewers, although their requirements are somewhat different.

The technique of obtaining pure cultures — whether by plating, single cell culture, or micromanipulation—is not dealt with in this book, although in the chapter on yeast genetics the advantages of single *spore* cultures are explained. Taxonomy is briefly dealt with, the Dutch classification being followed; recent modifications by Lodder and van Rij, which cut out a certain amount of

* *Yeast Technology*. By John White. B.Sc.(Birmingham), F.R.I.C. Pp. 432+ xvi. Chapman and Hall. Price 55s. net.

"dead wood," have not been included.

Two chapters by other specialists are included—on brewers' yeasts by C. Rainbow, and on yeast and the baking industry by A. J. Tipper. Later chapters include much original work on panary fermentation, relating to the effect of flour composition, the determination of activity and "salt sensitivity" of yeast, and the influence of temperature and of various additives.

Among other subjects dealt with are food yeasts; dried yeasts; yeasts and animal nutrition; chemical inhibitors; and effluent disposal from yeast factories.

A favourable reviewer is customarily allowed one bite, and it is therefore permissible to express the hope that the next edition of this valuable work will show further editing of the material. Much of the book is based on papers contributed to technical journals, and their collection has resulted in frequent repetition, *e.g.* the references to commercial riboflavin production on pp. 10, 308, and 312. It should also be possible to improve the balance and arrangement of material. It is not clear why the two chapters dealing with chemical inhibitors should be separated; the same applies to the chapters dealing with the use of yeast in baking.

These are minor criticisms of a book so well produced and so full of information. Illustrations and indexing are good, and references numerous. *Yeast Technology* will be found an essential source of information by bakers, brewers, vinegar makers, and by all who are interested in questions relating to yeast growth or industrial fermentations.—L. D. G.

Vegetable Oils

WORLD supplies of vegetable oils available for food uses in 1953, including those for the manufacture of margarine and compound cooking fat, remained greater per head of the population than in pre-war years. A recent review* of production and trade shows that world output of vegetable oils in 1953, although slightly below the record level of 1952, was nearly one-fifth larger than pre-war. Preliminary details for 1954 indicate that a very high level of production should again be reached, while stocks, notably in the United States, are abnormally large. The Commonwealth, an important producer of several oilseed crops, was responsible in 1952 for as much as 35 per cent. of world exports, compared with only 26 per cent. in 1951. International prices of most vegetable oils have been relatively stable since 1952.

The net supplies of vegetable oils and oilseeds entering into world trade during 1952 amounted to some 3·3 million tons, in oil equivalent, compared with 3·9 million tons in the previous year and 4·3 million tons in 1938. Preliminary details for 1953 indicate little overall change in the volume of trade; prospects for 1954, however, are good, especially for groundnut and cottonseed oils, which have been in relatively short supply since the war.

Cottonseed oil from United States surpluses is being sold to Western Europe for sterling and other non-dollar currencies and it now seems likely that there may be further measures of this kind. Production of oilseed crops in the United States has remained well above pre-war and this, together with the decline in the output of soap (reflecting the increase in synthetic detergents), has resulted in considerably increased exports from that country and sharply reduced imports.

The supplies available during recent years to importing countries, other than the United States, have consequently been only slightly below the pre-war level. United Kingdom purchases, made largely under long-term contracts, have been well above the 1934-38 average and *per caput* consumption of vegetable oils as food in this country rose from a yearly average of approximately 14 lb. (crude equivalent) in 1934-38 to 25 lb. in 1948-52; increased consumption of margarine and compound cooking fat has thus offset the decline in butter and lard.

The Commonwealth normally accounts for between one-fifth and one-quarter of world oilseed crop production and is even more important in relation to world trade. The improvement in Commonwealth exports during 1952 was mainly attributable to the recovery in shipments from Nigeria, although copra and coconut oil supplies from Ceylon were also at a high level and total exports from India were fairly well maintained. Preliminary details for 1953 indicate record shipments from Nigeria but a moderate decline in exports from some other countries.

Prior to the war, the Commonwealth had a large trading surplus in oils and oilseeds, especially in groundnuts, copra, and palm kernels. The subsequent marked decline in Indian exports and the rise in United Kingdom purchases have much more than offset the heavier Nigerian shipments; the Commonwealth has consequently been an overall net importer in every post-war year.

The import balance increased sharply during 1951, but there has since been a marked improvement; prospects for 1954 indicate a high level of Commonwealth exports, which may be accompanied by heavier U.K. imports.

A significant post-war development has been the increasing proportion of produce shipped in the form of oil, as opposed to seed, following the expansion of crushing industries in many seed-producing countries, both Commonwealth and foreign. Exports of oil accounted for nearly half the exports from seed-producing countries in 1948-52, compared with little more than a quarter in 1934-38. One consequence of this has been the creation of excess capacity in several Western European crushing industries, a trend which may be accentuated.

The review contains detailed statistical appendices showing the annual available supplies of vegetable oils in important consuming countries, the production of soap, margarine, and compound cooking fat, with the utilisation of oils and fats in these commodities, and a section on whale oil production and trade.

* *Vegetable Oils and Oilseeds, 1953.* Pp. 155+xvi. Published for the Commonwealth Economic Committee by H.M.S.O. Price 5s.

Abstracts From Recent Food Literature

Milk Sterilisation. (*Oléagineux*, 1954, **9**, 195.)—Brief description of a new system of milk sterilisation, developed by Stork (Netherlands), already used in Holland, Belgium, and Germany and recently introduced into South Africa (United Dairies, Port Elisabeth). Milk, propelled by a centrifugal pump, is homogenised, pre-sterilised at 135°C., cooled to 70°C., bottled and finally sterilised in vertical steriliser columns of 45 ft. height, capable of dealing with 6,000 litre bottles per hour. The special feature of the process is the application of the highest possible temperature during a short time. This is made possible by the pre-sterilisation process which has the further advantage of producing milk of perfectly uniform quality. Wasteful cooling (especially expensive in tropical regions) is avoided. The method, which is economical in operation, can also be applied to other food products, such as condensed milk and canned preserves.

Pilot Tests with Bactericidal Admixtures to Ice used for Fish Storage. W. Partmann (*Kältetechnik*, 1954, **6**, 66).—The West German Federal Research Institute for Food Preservation, Karlsruhe, has carried out pilot experiments with a number of bactericidal additions to ice used for the cold storage of fish, in order to test their preserving efficiency. The tests were carried out on an intimate mixture of the muscle of fresh tench and cod-fish, stored up to 20 days at a temperature of +1°C. in the presence of the different bactericides. The material was subsequently tested for taste, basic nitrogen contents, tyrosine nitrogen contents, and number of bacteria. Best effects were obtained by formaldehyde and Salthion, a proprietary sulphonamide product. The bactericidal effect of certain sulphonamides on fish bacteria is so striking as to call for further examination and confirmation by large scale tests.

Cold Storage of Potatoes. L. Nicolaisen-Scupin and N. Nicolaisen. (*Kältetechnik*, 1954, **6**, 62).—Report on systematic tests to determine the best conditions for the cold storage of potatoes. For this purpose, potatoes of selected varieties were cold-stored on racks specially designed to provide different conditions of cross-ventilation, and were systematically observed over a period of time. Records were kept of all relevant data such as temperature, humidity, air movement, weight, chemical composition, contents of solids, carbohydrates, nitrogen, albumen, ascorbic acid, sugar, and changes in colour, smell, consistency, and taste. It was found, *inter alia*, that it is of vital importance to ensure a uniform temperature by appropriate stacking, and that there are considerable differences in the behaviour, in cold storage, of different varieties. Potatoes of suitable varieties can still be used as seed potatoes after undergoing cold storage.

Utilisation of Residues of Citrus Fruit Processing. J. L. Fernandez, J. M. Viguer y Lobo, J. R. Iranzo (*Información Conservera*, 1953, **1**, December, 13).—A Spanish research team has investigated the possibility of using chlorinated waste products of citrus fruit processing as insecticides. First experiments carried out with orange residue chlorinated with carbon tetrachloride encouraged the belief that commercial utilisation of waste from citrus fruit juice production may be possible.

Utilisation of Ultra-violet and Infra-red Rays in the Fruit Industry. E. Navellier (*Fruits*, 1954, **9**, 70).—First part of a survey of modern radiation methods as applied in the fruit and related industries. Distinction is made between action to improve the physiology of fruit and vegetables (ripening, coloration), germicidal action, bactericidal action, and various incidental applications. Examples of physiological applications, established or still in the trial stage, include coloration of apples and tomatoes and the ripening of dates and vanilla pods. Germicidal installations include several varieties of mercury vapour lamps, designed to sterilise the air in processing and storage premises, or in some cases to sterilise water or other liquids such as fruit juices, wines, and cider. Ultra-violet radiation for bactericidal purposes is being used in several patented applications in the production and bottling of fruit juices. The survey is accompanied by brief descriptions and photographs of apparatus.

The Fabalet Process of Chocolate Moulding and Wrapping in Rhodialine. R. Mouchet (*Revue Technique de l'Industrie Alimentaire*, 1954, **2**, February, 33).—Visit to a small fancy chocolate factory at Ablon, the owner of which, M. Fabalet, has invented a system (since applied under licence by well-known chocolate makers) of combining the moulding and wrapping of fancy chocolate goods in a single process. While the conventional process is wasteful in material, time, and labour, involving as it does the moulding of the chocolate in tin moulds, removing it carefully from the latter, wrapping it, and cleaning the moulds for re-use, the Fabalet method is an all-in-one process in which a transparent plastic material, Rhodialine, plays the part of the mould as well as that of permanent wrapping.

Smoky Odour and Butyric Acid Odour of Raw Cacao. O. F. Kaden (*Gordian*, 1954, **53**, No. 1278, 10).—Cacao beans are sometimes affected by unpleasant foreign odours, including two which are sometimes mistaken for each other, viz. "smoky" odour and "hammy" odour or, more precisely, the odour of butyric acid. There is no known remedy for beans affected by "smoky" odour, believed to be caused by accidental contact with evil-smelling wood or grass distillates during the drying process at the plantation; these beans are unmarketable. Butyric acid odour, on the other hand, is caused by over-fermentation and can often be removed during the subsequent processing. The Cacao Research Institute at Hamburg has developed methods which permit the detection and identification of these odours.

Flavour-fortified High Density Frozen Citrus Concentrates. R. G. Rice, G. J. Keller, R. J. McColloch, and E. A. Beavens (*J. of Agric. and Food Chem.*, 1954, **2**, 196).—Full flavoured, high density frozen orange juice and grapefruit juice concentrates were prepared successfully by adding appropriate amounts of cold-pressed peel oil to juice concentrates of the desired level of concentration. Packs of different concentrations from fourfold to sevenfold were prepared and their storage behaviour was studied at −18°C., −7°C., and 5°C. Flavour and cloud stability at −7 C. and 5°C. increased with increasing concentration of the juice above fourfold. The degree of cloud stability obtained at the sixfold level of concentration was equal to that obtained by stabilisation of fourfold concentrates by partial heat treatment.

The Extraction of Sucrose from Molasses. G. Machell (*Chem. Prod.*, 1954, **17**, 100).—Attention is drawn to the wastage of sugar involved in allowing molasses to be left with a free sugar content. The advantages and disadvantages of the chief methods used for recovering sucrose from molasses are reviewed, *i.e.* the Steffen and the baryta processes, and a description is given of a process first put forward by Arnal, pointing out its theoretical advantages compared with the practical methods used.

Corrosion Problems of Ammonium Sulphate Manufacture. A. W. Bamforth (*Corrosion Tech.*, 1954, **1**, 31).—In the manufacture of ammonium sulphate, whether by using evaporators or saturators, the erosive effect of crystals present in solution, the low sulphuric acid concentrations usually present, and the relatively high temperatures of operation give rise to serious corrosion problems which begin at the drawing board stage of design and continue through all stages of manufacture. Such problems are discussed in detail and advice is given on materials of construction, including stainless steels, nickel alloys, rubber-lined mild steel, lead, silicon irons, aluminium, and a number of plastics.

Phosphorus for Detergents. (*Man. Chem.*, 1954, **25**, 143).—A new phosphorus factory at Bristol which has just gone into production has a capacity of more than 40 million lb. per annum. Much of the phosphorus will be used for the manufacture of sodium tripolyphosphate, an important ingredient of synthetic detergents, which hitherto has had to be imported on a large scale from the Continent. A description of operations at this new factory is given.

Preparation of Fresh Italian Prune Juice Concentrates. L. H. Walker and D. C. Patterson (*Food Tech.*, 1954, **8**, 208).—Information is presented concerning the conversion of Italian prunes into attractive and tasty juice and juice concentrate products. A description of the process, the equipment needed, and the results of investigations of the effects of maturation before harvest, removal and return of essence, temperatures during concentration, and temperatures during storage upon the product are included.

Preliminary Experiments in the Use of Chlorella as Human Food. Y. Morimura and N. Tamiya (*Food Tech.*, 1954, **8**, 179).—The use of unicellular algae such as chlorella as a food supplement is discussed. Algal powder increases the protein and vitamin content of foods to which it is added. Palatable bread, noodles, ice cream, and soups, thus fortified, are described.

The Field Fumigation of Groundnuts in Bulk. L. A. W. Hayward (*J. of the Sci. of Food and Agr.*, 1954, **5**, 192).—Sacks of decorticated groundnuts stored in two types of open-air sacks in Kano, Northern Nigeria, were fumigated with methyl bromide under gas-proof sheets to control *Trogoderma granarium* Everts. A report is given on the investigations made on the distribution of the gas during fumigation.

New Breadmaking Technique. (*The British Baker*, 1954, **128**, Apr. 23, 37).—A description is given of the Wallace and Tiernan system of continuous dough mixing. Regular commercial bakery formulae are used by the new process. The system is unconventional in the steps of production.

Biscuit Wheats and Biscuit Flours. (*Milling*, 1954, **128**, 470).—Report of a conference, the object of which was to discuss the various problems associated with the production of flour suitable for use in the manufacture of biscuits. Papers were read on biscuit wheats and the contribution of the modern mill to biscuit flour production.

Improving the Cream-line on Bottled Milk. E. Wilcke (*Milchwissenschaft*, 1953, **8**, 230).—In flash pasteurisation of milk at temperatures above 71°C. the creaming properties of the milk are partially lost. In order to avoid this defect a variation in procedure has been described, by which the raw milk is first of all preheated to between 35° and 38° C. and then passed through a cream separator. The cream is homogenised at 150 atmospheres and then mixed with the skim milk flowing from the separator. The mixture is flash pasteurised at 71·5° to 73°C. and finally brought to the correct standard with flash pasteurised skim milk. The cream layer in milk produced by this technique shows a considerable improvement over that treated in the normal manner.

Bread Microbes Illustrated

THE 33 excellently produced photographs of micro-organisms, yeasts, and fungi encountered in the baking industry, with descriptive text in German, French, and English, contained in a recent book* should prove of considerable help as a work of reference in the bakery and other laboratories. The photographs, measuring 5 in. by 5 in., show the organisms magnified from 200 to 1,650 diameters.

The book is divided into four sections: (1) the micro-organisms and (2) types of yeasts found in leaven; (3) the fungi, and (4) an appendix containing identification tables of bacteria, yeasts, and fungi.

With excellent forethought, the publishers have put a transparent, waterproof cover on the book, thus protecting it from the hazards of the laboratory bench.

This book can be recommended not only to the student as an adjunct to his text-books, but also to the bacteriologist as an *aide-memoir*.

* *An Atlas of Bread Microbes.* By Adolf Schulz. Pp. 96. Hugo Matthaes Verlag. Price DM. 12.80.

News from the Industry

FORTHCOMING EVENTS

The Food Education Society

The next meeting of the Food Education Society will take place on June 3, when the subject will be "Milk for Health." Lord Horder has kindly consented to take the chair. Among the speakers will be Prof. H. D. Kay and Dr. J. G. Davis.

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The Royal Sanitary Institute

At the Bath Sessional Meeting of the Royal Sanitary Institute to be held on June 11 at 10.15 a.m., in the Pump Room, Bath, papers on "Personal Standards of Hygiene" and "Chemical Agents and Poisonous Metals in Food" will be read by B. A. Astley Weston, M.O.H., Bath, and A. Tyler, Chief Sanitary Inspector, Bath, respectively.

*

The Royal Institute of Chemistry

A comprehensive programme of summer visits has been arranged for June and July by the Royal Institute of Chemistry, London Section. These are as follows:

June 2. 2.30 p.m. Visit to Lewis Berger (Great Britain), Ltd., at Homerton, London, E.9.
June 10. 2 p.m. Visit to Kent Oil Refinery, Isle of Grain, Rochester, Kent.
June 16. 12.30 p.m. Visit to British Drug Houses at Poole.
June 17. 2.30 p.m. Visit to John Dickinson and Co., Ltd., at Watford.
June 22. 2.30 p.m. Visit to Tip-Top Bakeries at Orpington.
June 23. 2.15 p.m. Visit to I.C.I. Plastics Division at Welwyn Garden City.
June 24. 2.30 p.m. Visit to the B.B.C. Television Studios, at Lime Grove.
June 26. 11 a.m. Visit to the Atomic Energy Research Establishment at Harwell.
June 29. 2 p.m. Visit to Kodak Ltd., at Harrow.
July 1. 2.30 p.m. Visit to A. Wander, Ltd., King's Langley, Herts.
July 3. 10.30 a.m. Visit to Betteshanger Colliery, Nr. Deal, Kent.
July 6. 2.30 p.m. Visit to May and Baker Ltd., at Dagenham.
July 8. 2.30 p.m. Visit to the B.B.C. Television Studios, at Lime Grove.
July 12. Afternoon and evening. King's College Sports Ground. Mitcham, Surrey. Tennis tournament and dance.

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25 Years' Service

To mark his 25 years' service with National Adhesives, Mr. John L. Prosser has been presented with a gold watch by the President of the National Group, Mr. Frank Greenwall, of New York. Mr. Prosser joined the company when he was 21.

Success of "Corrosion Technology"

In March, 1954, the Leonard Hill Technical Group started a new journal, "Corrosion Technology" as a supplement to "Chemical and Process Engineering."

As a result of the phenomenal interest evoked by this new journal, the original intention of continuing publication as a supplement has been revised and beginning with the June, 1954, issue it will appear as a separate journal in a considerably enlarged form.

Ladies' Evening at Manchester

About 300 members and their wives were present in the Great Hall of the Technical College, Manchester, to hear Mr. G. Osgood, M.A., F.R.I.C., a member of the committee, give an excellent discourse on wines, illustrated by numerous slides showing the whole process from the planting of the vine to the finished article. The occasion was the ladies' evening organised by the Manchester and District Section of the Royal Institute of Chemistry. After an adjournment for a buffet supper, members and visitors were invited to sample wines displayed by some 24 firms, mostly local, although London, Liverpool, Bristol, and German companies also took part in the display. The range was extensive and hardly any well-known type of wine was omitted.

The committee were congratulated for their excellent organisation of an enjoyable evening.

B.B.I.R.A. Library Extension Opened

A pleasant little ceremony took place at the British Baking Industries Research Association on April 28, when Mr. Trevor A. Bowen, D.L., J.P., Master of the Worshipful Company of Bakers, opened the new library extension at the Research Station, Chorleywood, and placed on one of the shelves a presentation copy of the history of The Worshipful Company of Bakers of London.

Mr. Trevor Bowen compared present-day conditions with those existing at the time of his own training in the baker's craft. The old masters had produced many books which were now on the library shelves and Mr. Trevor Bowen expressed his pleasure at having been able to help towards the establishment and equipment of a Research Association. In his concluding remarks, Mr. Trevor Bowen stated that he would be pleased to give another £250 to the Research Association. This further gift is in addition to the sum of £250 which he had already given towards the cost of extending and re-equipping the library.

Soya Research

The National College of Food Technology has recently accepted the offer of a Research Fellowship by British Soya Products for work on soya or soya products in relation to the food industry. The Fellowship, of the value of £400 per annum, is intended to cover the cost of maintenance and College fees, and applications are now being invited from graduates in chemistry, physics, or microbiology. The Fellowship is offered for one year in the first instance, but may be extended for a further period.

This practical form of support for the National College may well encourage other members of the food industry to follow their example. With the return of competitive conditions in the industry, it is obvious that a more intensive application of scientific knowledge will be required, and the National College, with its pilot scale plant for training in canning, dehydration, quick freezing, and similar food processing operations, is well equipped to play an increasingly important part in this effort by the training of food technologists and food scientists.

Fish as a Food

The first of a new series of meetings held by the Food Education Society on April 22 was devoted to the subject of fish.

The chair was occupied by Mr. J. Croft-Baker, O.B.E., President of the British Trawlers Federation, who gave a brief but informative talk on the present situation of the fishing industry.

Skipper Oliver, for eight years secretary of the Hull Trawler Officers' Guild, followed with an interesting account of his experiences in the fishing industry from his boyhood days to the present time. He drew vivid contrasts between present-day conditions and those existing about 1906, when he started working in the industry. During his talk, he conveyed a convincing impression of the extreme degree of efficiency of the work carried out in the trawlers, ensuring the high quality of the fish delivered at the docks.

The dietetic aspects of fish were discussed by Dr. Franklin Bicknell, D.M., M.R.C.P., who deplored the fact that fish was so seldom eaten for breakfast. The great variety of fish rendered meals less monotonous. With the exception of kippers and haddocks, fish was one of the few foods to which chemicals in some form or another were not added.

The final talk was given by Mrs. Marguerite Patten, who gave her audience some useful tips on the cooking of fish.

A Dexion conveyor for soap wrapping, with assembly and packing table at the end.

Slotted Angle Development

An impressive exhibition of their new development in light constructional material was held recently at the Waldorf Hotel by Dexion Ltd., pioneers of the Slotted Angle.

The history of the company is one of Britain's post-war industrial success stories. Seven years ago its name was unknown; today it is a self-financed international organisation with an annual turnover of £1¼ million, and three factories in North London, one in Belgium, one about to go into production in Canada, and one under construction in Australia.

The new light constructional material—Dexion 225—has the following advantages:

1. Its size (2¼ in × 1¼ in.), making it lighter, easier to handle, and quicker to cut; it also occupies less storage space than previous models.
2. Its cheapness—up to 15 per cent. cheaper, depending on quantity.
3. As an upright it is 25-50 per cent. stronger.
4. It can be overlapped and spliced; short lengths can be used up, or lengths over 10 ft. easily made
5. Lengths will nest one inside the other for extra strength, if needed.
6. It is infinitely more adaptable, having round holes to enable positive bearing in all directions.
7. Triangulated structures can be built with ease and precision.
8. Its adaptability and interchangeability with stocks of existing Dexion no longer being made.

Among the exhibits at the Waldorf was a special Dexion tent requiring no guy-ropes or poles which was designed for the Burmese Army. The frame-work enables radar equipment to be attached firmly and it can be erected or dismantled with speed. One of these tents was used on the Ionian Islands after the earthquakes.

Trade with Brazil

The Export Credits Guarantee Department (the Government Department providing insurance against the major risks of exporting) announces that it is resuming a limited cover on exports to Brazil. It suspended the issue of all fresh cover for Brazil in May, 1952, at a time when its gross liabilities in that market totalled some £32 millions.

Cover on resumption will be limited to 80 per cent. of the credit granted (as against the normal 90 per cent. for most risks); the waiting period before loss is ascertained will be 12 months (as against the normal six months); there will be no cover for goods not of United Kingdom origin; exchange sale notes must be produced covering all payments due; and the Department will require prior proof of compliance with import licensing and exchange formalities before it comes on risk for any transactions.

The existing scheme for cover on shipments of spare parts (the only form of cover currently available) will continue to operate.

Steam Trap Developments

At the 21st annual Engineers' Conference of Spirax-Sarco, held at Buxton during the week before Easter, were discussed the latest product developments, the firm's technical contribution towards a higher productivity in steam and hot-water processes, and commercial expansion at home and abroad.

On view during the discussions on product developments were the redesigned Spirax Ogden open-top bucket steam traps and the latest additions to the range of inverted bucket traps of entirely new and unorthodox design. The series of redesigned Ogden steam traps is now complete, ranging from ½ in. size up to 2 in.

A development in connexion with the firm's already large range of pipeline strainers is that the Y-type will now be included among those patterns available as pressings.

Of the developments in Sarco thermostatic control equipment announced at the Conference is an automatic control for sterilisers. It is a completely new approach to this type of control (arising out of experience with an earlier model), operating on the liquid-expansion principle, non-electric, and incorporating a device which automatically adjusts the steam supply in accordance with the movement of the lid of the steriliser.

The predominant note of the technical application sessions of the Conference was the increasing contribution of the firm's heat control and heat transfer methods to the productivity of steam-heated processes in industry.

Although the many discussions ranged over a wide field of process steam usage, particular attention was given to problems in the milk industry and the brewing industry and in those industries where steam-heated cylinder drying machines are major items of plant.

In addition, there were lectures and discussions on water blending for process and heating and on improved steam and hot water methods at hospitals and laundries.

Annatto for Dairy Products

The British Standards Institution, in their series of standards covering dairy products, has issued B.S. 2450—"Annatto for dairy products."

This standard has been prepared with the object of reducing to a minimum the variations in the commercially available naturally occurring colouring matter known as "annatto."

While it has been possible to define in precise terms the colour of specified dilutions, it has not been possible to state with any degree of precision the colour imparted to cheese by the addition of a definite quantity of the colouring matter to milk.

This differs appreciably according to the type of cheese, method of manufacture, storage, etc. The colour also varies from rind to centre and even over a small area such as 1 sq. in., so that an estimate of the colour can be made only by averaging a number of readings.

In conformity with modern practice, the colour of standard dilutions of annatto has been expressed in C.I.E. units, but equivalents for two types of colorimeter commonly used in laboratory practice have also been given with the object of facilitating the measurement of the colour quality.

Seen at the B.I.F.

The floor of the Stelcon (Industrial Floors) stand at the Castle Bromwich section of the B.I.F. was formed with Stelcon anchor steel plates and steel clad flags, which have been widely used both at home and abroad in many types of factories because of their dustless, hygienic, and wear-resistant qualities.

The structure of the stand incorporated Stelcon storage wall units which provide a quick solution to the problem of storing loose bulk materials such as coal, coke, gravel, and scrap, and have a wide range of applications in many industries. Made of reinforced concrete, they are self-supporting and can retain loads against either or both sides simultaneously or separately.

*

Another interesting display was that of Padley and Venables, who showed stainless steel in all forms and finishes such as sheets, strip, bars, tubes, sections, wire, and components. Their display also included samples of stainless steel in its finished form with a dull or mirror polished surface, together with many examples of manufactured articles fabricated from this material.

A floor of Stelcon steel clad flags at the Plymouth bakery of Goodbody-Matthews.

Vegetable Waste for Soup Base

Among the many new applications for the Powling plant is that of utilising various extracts from fruit and vegetable materials in the production of soups, sauces, and purées.

Constructed in cast iron or stainless steel, three types of Protessor are now being marketed from the small type handling 20 to 30 lb. of raw material per hour, to the large scale plant handling 20 to 30 cwt. per hour.

Practical tests have shown that the processing of pea viner waste at the rate of one ton of raw material per hour produces 112 lb. of rich fibre-free "Protess" and 404 lb. of residue fibre, at a cost of 15s. per hour. The analysis of the products from this continuous process is as shown below.

This rich green precipitate, known as "Protess," can be incorporated in soups, and other types of waste material can be similarly processed to produce varying sorts of concentrates. Materials such as cabbage, beans, carrots, and carrot tops, yield wholesome extracts, and extracts can also be produced from second class vegetables that would otherwise be wasted or ploughed back into the land. The glut crop, either in the market or in the field, can also be dealt with in this manner.

	Protein	*Moisture*	*Fibre*	*Protein d.m.*
	%			
"Protess"	37	10	1	41·1
Fibre	12·7	10	27·2	14·15

The Powling juice extraction plant.

Changes of Address

The new address of Brian, Jenks and Co. is Sabian House, 26-27, Cowcross Street, Smithfield, London, E.C.1. Telephones: CLErkenwell 0315-9. Telegrams: Edibrian, Cent, London.

*

The Glasgow Sales Office of Brook Motors has moved to Carlton House, Blythswood Square, Glasgow, C.2. The new telephone number will be CENtral 1045.

OBITUARY

Mr. R. Arnison.

Mr. Rowland Arnison, managing director of Short and Mason, and a founder President of the Dairy and Ice Cream Association, on April 5 at the age of 75.

Joining Short and Mason in 1901, he became managing director in 1919.

He leaves a widow and three married daughters.

*

Mr. John Sherratt, the founder and senior partner of John Sherratt and Son, on April 24 in his 84th year.

*

Mr. T. E. Gallagher, of T. E. Gallagher and Sons, pickle and mineral water manufacturers, on April 28, in his 70th year.

*

Mr. Phillip T. Ward, a director of Thos. W. Ward Ltd., on April 29, at the age of 35.

Philips germicidal tube installation in the pie cooling room of Parsons and Sons.

U.V. Rays in Pie Manufacture

One of the most recent applications of ultra-violet irradiation is to be found at the premises of Edward Parsons and Sons of Irchester, manufacturers of meat pies. As a second line of defence against airborne contamination during the pie cooling process—a stage of manufacture at which this danger is most likely to occur—a Philips germicidal tube installation has been provided.

When the pies leave the baking ovens they are normally quite sterile. To correct pressure changes inside the pies during cooling, a small aperture is left in the tops. Mould spores and other micro-organisms are thus likely to be carried, by the normal circulation of air, into the pies, their moist interior providing a favourable breeding ground.

To counter this source of contamination, germicidal tubes have been mounted with the reflectors so arranged as to project the radiation towards the ceiling. By this means the air, circulated by convection, passes through the irradiated zone and is cleansed of the germs it contains.

Cooler for Sugar Confectionery

A confectionery cooler comprising a combined bucket elevator and trough scraper conveyor housed in a thermally insulated cabinet within which the temperature and humidity conditions can be controlled, is being marketed by L. Levasseur and Co. Its use provides a rapid and continuous means of hardening manufactured sweets, thus permitting them to be mass-packed immediately they leave the machines.

The air inside the cabinet is subjected to continuous re-circulation across refrigerated coils by means of fans. These coils are maintained, by thermostatic control of the condensing unit, at a temperature which will keep the air at between 45° and 50°F., the conveyor system being so timed that the product is subjected to these conditions for a period of eight minutes.

The use of this cooler obviates the necessity for cooling tables and, if local conditions demand, it can be made to operate as a de-humidifier allowing the sweets to be cooled under conditions of controlled humidity.

It can be used in the manufacture of all forms of toffees and caramels, bars or pieces, and low boilings whether these be either wrapped or unwrapped. It can also be used to advantage in the manufacture of chocolate panned confectionery by precooling the centres and effecting a more even covering of the chocolate.

While the coolers are generally unnecessary for temperature reduction with high boilings, since these can be adequately cooled at room temperature, they serve an important purpose in providing humidity control for the cooling operations of these products, where required.

Lyons new coffee drink, Chico, in one-cup packs constructed of Metalam.

Emulsifiers for Food Products

The colloid contained in Carrageen Moss belongs to the same family as the other well-known gums, tragacanth, agar-agar, and alginates. Extracted and purified in Norway from Irish moss harvested in Ireland and in Scandinavia, it results in a product of high molecular weight, consisting of long chains of molecules built up mostly of galactose groups.

This product, known as Norsk Gelatan, is extensively used as a thickener, stabiliser, emulsifier, and for forming gels, thus having wide applications in all branches of the food industry. It is tasteless and does not affect the colour of the products to which it is added.

It is marketed in this country by Finch and Knight Ltd., on behalf of the manufacturers in Kristiansund North, Norway.

Mechanical Handling Equipment

Electric plant and apparatus for application to all kinds of mechanical handling equipment will be exhibited by the British Thomson-Houston Co. at the Mechanical Handling Exhibition. In addition to electric motors from fractional horsepower sizes upwards, there will be displays of industrial electric control gear, electro-hydraulic thrustors, and typical applications of electronic equipment for the automatic and accurate control of industrial processes.

Working exhibits of industrial electronic equipment will include photo-electric relays and a high-speed batch counter capable of operating at any preselected number between 1 and 9,999 at a maximum speed of 40,000 counts per minute. The equipment is arranged as a simple demonstration to count articles on a moving conveyor and divide them into batches of a required number after the pre-set figure has been reached.

Food from Scotland

A new skinless pork sausage, introduced in Scotland by McGrouther of Stirling, is claimed to have better keeping qualities, not to shrink on frying, and to take less fuel in cooking.

The sausage is being marketed in 1 lb. packs for general release and is also available in catering sizes.

The company has recently installed the first drier/cooler of the type to be introduced into Scotland. Handling between 500 and 700 lb. of sausages per hour, it dries and cools them ready for distribution or for storage.

Another development is a Family Pie, prepacked in transparent paper, suitable for a family of six.

Canned haggis has been introduced by R. and H. Turnbull of Bridge of Allan. The 20 oz. can is attractively covered by a Tartan label and is designed essentially for the export trade.

APPOINTMENTS AND RETIREMENTS

Mr. E. O. Britton has joined the Board of Directors of Graham and Co., dried fruit importers.

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At the annual general meeting of the Federation of British Industries, Sir Harry Pilkington was re-elected President for a second year of office.

*

Mr. E. L. Bush, who relinquishes his appointment as managing director, has been appointed chairman of the Board of Directors of W. J. Bush and Co., and Messrs. C. F. Bush and A J. McIntyre have been appointed joint managing directors.

*

Mr. Ean C. Baillie, C.A., of Layton-Bennett, Billingham and Co., has been appointed a director of Howards and Sons and Howards of Ilford.

Mr. Edward G. Rooney of The Charterhouse Investment Trust has been appointed a director of Howards and Sons.

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Over the past two years, the British Baking Industries' Research Association, Chorleywood, has increased the number of visits paid by members of the technical staff to members' bakeries. This programme, together with the increasing visits required to be made as a result of day-to-day production problems submitted by members, has led the Association to strengthen the outside technical staff, the most recent appointment being that of Mr. G. A. Price, formerly Bakery Adviser to British Fermentation Products.

Mr. Price served his apprenticeship in a small bakery and subsequently had extensive experience in the industry over many years in both small and plant bakeries. He was the first full-time instructor for the Allied Bakeries' Training Scheme and later assisted Mr. W. E. Spencer on the National Bread Survey of the Ministry of Food.

*

The resignation of Mr. T. A. H. Sycamore, C.B.E., as Director and General Secretary of the Food Manufacturers' Federation and as Secretary to a number of national trade organisations affiliated to the Federation, is announced.

Mr. Sycamore has been in the service of the Federation for more than 18 years, having joined the staff in 1936, being promoted to the position of Assistant Secretary in 1942, Secretary in 1945, and further promoted to be Director and General Secretary in 1947. He left the service of the Federation on May 31, 1954, to take up an appointment as Assistant Managing Director of Oxo Ltd.

The Executive Committee of the Federation has appointed Mr. Frederick Lawton in succession to Mr. Sycamore. Mr. Lawton joined the Federation as Assistant Secretary in 1948 and in 1952 was promoted to the position of Deputy General Secretary.

*

Mr. J. Valentine Backes, A.R.C.Sc., F.R.I.C., D.I.C., has been appointed to the Board of Burton, Son and Sanders, as Director and Controller of Production and Sales throughout the company and all its branches.

Production operates at three main factories with additional sugar mills and distribution centres throughout England, Scotland, and Northern Ireland. The sales personnel numbers 80 representatives with additional branch executives.

By this appointment, Mr. Backes will retain his interests in the baking industry with which he has been actively associated for so many years.

A coaching print of Regency times has been used by Richard Lonsdale-Hands Associates for a new Peek Frean biscuit tin.

Fatstock Marketing

The commercial company sponsored by the three United Kingdom Farmers' Unions to market fatstock on a dead weight and grade basis is being formed under the proposed name of the Fatstock Marketing Corporation Ltd.

As soon as control ceases in July, the Corporation will be in a position to offer, as an alternative to the live auction, dead weight marketing facilities for about one-fifth of the country's total supplies of fresh meat. This represents a million cattle units a year, or an annual turnover of about £60 millions at current prices, one cattle unit being equivalent to one beast (bullock, cow, etc.), or two pigs, or five sheep, or three calves, or one sow or boar.

This does not include the trade in bacon pigs, which may increase the Corporation's turnover in its first year to well over £100 millions. Special arrangements are being made to meet the needs of bacon curers.

Quick Freezing at Sea

The trawler-cum-factory vessel, *Fairtry*, built in Aberdeen for Salvesen of Leith, has now completed her preliminary trials. This ship is capable of making trips of two to three months, returning with her catch factory-frozen for the market. The *Fairtry* incorporates many improvements on the original ideas used on the prototype, *Fairfree*, but maintains the basic principles used on that ship.

The importance of this new ship lies in the fact that she can demonstrate on a commercial scale the value of a factory-ship operation, and point to a possible solution of the problems of the fishing industry. Whether the capital is available generally to allow the smaller owners to build such ships is problematical, but there is definite interest to see the practical results when the new unit goes into full operation.

Sprouting Grain for Cattle Feed

A new unit to sprout grain, designed by a Larbert food engineer, provides increased bulk of feed for pigs, poultry, and cattle. The equipment is inexpensive to build, and runs at a very low weekly cost. Using soil-less cultivation methods, growth up to 5 in. height has been achieved in one week, giving seven times the weight of the original grain. Initial experiments with poultry have shown maintenance of egg output; a controlled test is now being undertaken to check on returns where the sprouted grain is used as an exclusive feed.

Earlier work on these lines in this country failed to develop because of flaws in the productive system; it is believed that these have now been eliminated, resulting in the building of a cheap, efficient, and high cropping grain sprouter.

Oil Product will Keep Eggs Fresh

SPRING OUTPUT CAN BE USED NEXT CHRISTMAS

During the present season of surplus egg production, millions of new-laid eggs are being preserved in the U.K. by oil dipping before cold storage. By this combined treatment, taste and quality are retained for as long as seven months.

The deterioration of an egg being caused partly by micro-organisms entering the porous shell and partly by the escape of moisture and carbon dioxide as the egg albumen breaks down, infection occurs in the waiting period before the egg can be placed in cold storage; low temperature will delay subsequent deterioration but will not prevent it. Pre-storage dipping in mineral oil fills the pores of the shell with oil, preventing the entry of microbes and lessening the loss of moisture and carbon dioxide. In order not to harm the egg, oils used for dipping must be odourless, tasteless, and colourless.

Although about 90 per cent. of the eggs now imported into Great Britain from such major egg-producing countries as Australia, Canada, Denmark, and Holland are oil-dipped for better preservation, this method is comparatively new in the U.K. It was confined to Canada, the U.S.A., and Australia until 1949, when the Ministry of Food, after investigations by the Department of Scientific and Industrial Research, carried out large scale trials. In Holland, the Shell laboratories at Amsterdam had collaborated with the Dutch Association of Poultry and Eggs in a long series of tests on various oils.

Only eggs of the best quality when "candled" should be oil-dipped. Eggs with dirty, cracked, or broken shells are not suitable for dipping. Past trials have shown that, while it is desirable to oil eggs as soon after laying as practicable to prevent microbial invasion of the egg interior, the optimum time for oiling is 24 hours after laying, since eggs oiled immediately after laying had an albumen quality inferior to those treated after 24 hours. It was seen too that the most satisfactory results could be obtained by oiling at a temperature of approximately 70°F., this temperature allowing the egg to be adequately coated with oil and at the same time preventing excessive quantities from remaining on the shell. After dipping, the eggs are cold stored at about 30°F. until required for distribution.

The largest of the firms taking part in the early tests in Great Britain was the Yorkshire Egg Producers Limited, Drighlington, which last year packed some 200 million eggs—$\frac{1}{10}$ of the total number packed in the U.K. by over 400 stations. Eggs are collected weekly by this wholesale organisation from 16,000 farms in Yorkshire and North Lincolnshire and conveyed to its nine packing stations. At these streamlined egg "factories," the eggs pass along conveyor belts for preliminary sorting for obvious defects, "candling" for inside faults, automatic grading by weight, stamping, and repacking for weekly delivery direct to 6,250 retailers, mainly in Yorkshire. The firm, which at this time of year may handle over six million eggs a week, operates a fleet of 92 vans, capable of carrying 120 cases each containing 30 dozen eggs.

From mid-April to mid-May, Yorkshire Egg Producers expect to dip nearly three million eggs at their Driffield branch, with the aid of two oiling machines. The eggs for preservation will be "candled" and graded in the normal way, transferred from Keyes trays, which hold 2½ dozen, to wire baskets and lowered by the machine into a bath filled with 4 in. of oil. They are then passed over brushes to wipe off the surplus oil and allowed to drain for a few minutes before being replaced on the Keyes trays, stacked into cases and, finally, put into cold storage. With three girls operating the machine, up to 25 cases an hour, or 1,000 a week, can be filled. All eggs thus oiled are stamped with the word "Sealed" and, as an extra precaution, will be re-candled before distribution.

Egg-oiling has so far been carried out only on a small scale in the U.K., owing to the shortage of eggs. It is probable, however, that it will be more widely adopted in future if British egg production, which has this year increased by nearly 10 per cent. as a result of improved methods of poultry keeping and the derationing of feedingstuffs, maintains its upward trend.

Trays of eggs are lowered into a bath containing 4 in. of oil.

Tilter for Carboys

A new carboy tilter, manufactured by Powell and Co., is fitted with a sliding clamp resting firmly upon the top of the glass bottle from which it is insulated by heavy gauge rubber tubing; the clamp does not come into contact with the iron skip or hamper. By this means the provision of the usual ring surrounding the neck of the bottle, which so often corrodes and causes fractures of the glass neck during cold weather, is rendered unnecessary. There is also uninterrupted access to the neck of the bottle when pouring, so reducing danger of spilling.

In addition, the usual chain or hinged bar across the front of the carboy which may rust or corrode away is dispensed with.

This new safety device is made from tubular steel and finished with two coats of anti-corrosive paint; the sliding clamp has powerful jaws that do not damage the handle.

Ham Cheese

Primula ham cheese, introduced to Norway last year by Kavli Ltd., is now available in Great Britain.

The ordinary Primula cheese, the new ham cheese, and Primula Crispbread are now all made in this country, and are available throughout the British Isles.

Branded Cooking Fat

A new cooking fat, Cookeen, was introduced by Van den Berghs for sale from May 10.

Cookeen will sell in approximately the same price range as lard.

ERECTIONS AND EXTENSIONS

A new building to accommodate tin washing plant is being erected at the Great Yarmouth factory of Smith's Potato Crisps.

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Plans for the erection of a new jam factory on a site at The Steyne, Acton, W.3, are being drawn up by the Co-operative Wholesale Society. It is estimated that this project will cost £134,000.

▪

New Incinerator Factory

In conjunction with Saniguard Appliances, their associated distributing company, Allied Metals, have just completed the construction of a new factory in the Greater London area at Fowler Road, Hainault, Essex, to expand the productive capacity of their Barrywald sanitary incinerator.

At the new factory will be produced the latest design of this modern British incinerator with the most advanced machine tools and processes under centralised and highly exacting inspection. A team of service engineers, each with a service van, will also be able to advise on installations, demonstrate, and attend to minor adjustments or replacements.

The Head Office and Sales Departments remain at 62, London Wall, London, E.C.2, to which all enquiries should be addressed.

COMPANY NEWS

The consolidated net profit of L. Rose and Co. for the year ended December 31, 1953, after debiting all charges, including taxation, is £47,419 against £43,279. The provision for taxation on current profits is £78,306 against £64,573 and, after crediting amounts over-provided in previous years of £5,415, the charge in the accounts is £72,891.

An interim dividend of 5 per cent. was paid on the Ordinary shares at the end of October, 1953, and the directors now recommend a final distribution of 12½ per cent., again making a dividend of 17½ per cent., and in addition a bonus of 2½ per cent. for the year ended December 31, 1953. These dividends and the bonus absorb a net amount of £28,314 against £24,453 in the previous year.

▪

At the 41st annual general meeting of The United Glass Bottle Manufacturers, the directors recommended payment of a final dividend on the Ordinary Stock of 10 per cent. (making 17½ per cent. for the year) less income tax. Circulated with the report and accounts for the year ended December 31, 1953, was a well-produced brochure which illustrates in simple form the Group operation in Scotland where production now runs at the level of 300,000,000 units annually and where further expansion is planned.

OBITER DICTA

● An odd shot with an egg is not cruelty; but if you go on doing it I suppose it may be cruelty.—*Lord Justice Singleton.*

● When I am in the company of scientists, I feel like a curate who has strayed into a room full of dukes.—*Mr. W. H. Auden.*

● Embodied in the production of the new Kraft margarine will be American know-how.—*Extract from a press release.*

● I recall eating some jolly good ice cream in the days before the scientists came into the business.—*Francis Brooke, writing in "Facchino News."*

● An unknown girl has been chosen as "Miss Grapefruit" for a grapefruit poster campaign because her face symbolises the fresh, clean qualities of the best grapefruit.—"*Daily Express.*"

● I was amazed to find that 14 oz. of fresh herring or pilchards are equivalent in food value to 2 lb. of chicken or 1 lb. of sirloin steak or 13 oz. of lean ham.—*Mr. George Dawson.*

● Behind that luscious beefsteak from an animal dead two years, and the delicious grape juice that never saw a grape, is a world of scientific thought, research, and know-how.—*Institute of Food Technologists, U.S.A.*

● I appeal to all trawler skippers not to keep intoxicating liquor on the bridge. Excessive drinking at sea imperils both crews and ships.—*The Commissioner, R. F. Hayward, Q.C., speaking at the Ministry of Transport inquiry into the stranding of a Grimsby trawler.*

● Somebody wants gravy; somebody has gravy; the two are brought together by communication. That is how life proceeds; not, it is true, always garnished with gravy, but always animated by communication.—*Extract from "Food Topics," incorporating "Spirax Comment."*

● Too many scientific phrases have crept into hygiene; there is no better steriliser than hot water, no better bactericide than fresh air and sun, and no better detergent than soap and a scrubbing brush.—*Mr. Morley Parry, speaking at a bakery education conference at the Leeds College of Technology.*

BOOKLETS RECEIVED

Notes amplifying those on unwinding have been published in booklet form under the title "The Handling and Unwinding of Slit Rolls" by British Cellophane.

▪

A fully illustrated description of the APV cream treatment unit is contained in the company's latest brochure. The process combines the functions of pasteurising the cream before manufacture into butter and removing from it all those odours which detract from its palatability.

▪

Special control panels are the subject of a recent publication issued by Brook Motors, whose latest range of control gear for normal purposes is based mainly on a moulded plastic panel unit which is used throughout a variety of single and three phase starters for direct-on-line, star delta, reversing, stator/rotor, etc.

▪

The spring issue of the York Shipley house magazine, *Cold Logic*, contains some interesting articles on tube manufacture and the use of refrigeration in the manufacture of soft drinks and beer, and in the bakery and biscuit industries.

Collapsible Tubes in Food Manufacture

One of the objects of a recent meeting of the Collapsible Tube Manufacturers' Association was to bring both the present and the potential uses of collapsible tubes to the notice of representatives of certain associations, such as the Council of Industrial Design and the Institute of Packaging. Its primary purpose was to place at the disposal of any trade organisation a lecture and demonstration service, which would include a film strip.

This information service, while covering the properties and uses of all collapsible tubes, would include guidance on their surface treatment and printing for industrial artists and designers.

Another part of the Association's development programme is the provision of an advisory service on the use of tubes for the food industry.

In conjunction with the British Standards Institution, much progress had been made in the direction of standardisation of tube sizes and properties, and a British Standard Specification on Collapsible Tubes had been produced which would be invaluable in avoiding wastage.

Company Merger

Frank Pearn and Co., manufacturers of reciprocating type pumps, have been merged with Holden and Brooke, who, from April 1, have been the sole manufacturers and suppliers of the Pearn type pump.

World Food News

FORTHCOMING EVENTS

British Trade Fair

A British Trade Fair is to be held at Baghdad from October 25 to November 8, at which the foodstuffs industries will be well represented.

*

Fishing Industry Congress

The 15th National Congress of Fishing and Fishing Industries, held under the auspices of the *Société d'Enseignement Professionnel et Technique des Pêches Maritimes*, jointly with the *Société Française de Géographie Economique*, will take place at Algiers from June 21 to 27.

There will be sections covering the following subjects: scientific studies; legislation and economic studies; production equipment and methods; fish distribution; by-products; fish canning, salting, smoking, and dehydration; refrigeration; breeding of shellfish; propaganda; and overseas fishing.

Communications should be addressed to: *Délégué Général du Comité*, M. André Calandreau, 34, Rue de Bassano, Paris, 8e.

*

Chemical Engineering and Plastics

The third *Salon de la Chimie et des Matières Plastiques* will be held at the Parc des Expositions, Porte de Versailles, Paris, from December 3 to 12, 1954.

The exhibition will consist of four different sections, all complementary to each other:

1. *Laboratory Equipment.*—Instrumentation, optical, testing, measuring, control and regulating equipment.
2. *Chemical Products.*—Pure products, industrial products, finished products.
3. *Chemical Engineering.*—General plant, special plant.
4. *Plastics Industry.*—Raw materials, materials for processing, manufactured articles.

Concurrently with the exhibition, there is to be the third session of the Chemical Engineering Conference, during which specialists will review many of the problems encountered in the operation of modern factories.

Certain international technical meetings, including symposiums and discussions, will also take place during the exhibition, the following being among the topics of discussions already arranged: analysis and testing, optics, electronics, measurements, industrial control and regulation, anti-corrosion, paints, pigments, and varnishes, and cosmetics.

Prospective exhibitors and visitors are invited to address their enquiries to the *Commissariat Général du IIIe Salon de la Chimie et des Matières Plastiques*, 18, Rue Saint Dominique, Paris, 7ème.

Pasteurisation Plant for Ireland

The largest short-time pasteurisation plant in Ireland, a 2,500 gallons per hour Paraflow type HMA, has recently been installed at Merville Dairy, Finglas, Co. Dublin, by The A.P.V. Company. This large and old-established family dairy supplies the daily needs of a large area in and around the city of Dublin, a proportion of the milk being obtained from the dairy's own farms.

Reindeer Meat

The annual conference of Norwegian Lapps was held this year at Kautokeino, a township in the heart of Norway's Lapland. The conference, which lasted from March 25 to 29, concerned itself largely with discussing the problems of marketing reindeer meat. The reasons why reindeer meat was not so readily saleable as other meat were examined in detail. It was agreed that the most important reason was the shortage of slaughterhouses and freezing plants, and the conference decided to ask the Norwegian Government to assist in the building of slaughterhouses and freezing plants at Kuatokeino and Karasjok, the two chief Lapp centres.

Research on Wheat

The Commonwealth Bank of Australia has made a grant of £A2,000 to aid research into the quality of Australian wheat and bread.

Mr. E. E. Bond, Director of the Bread Research Institute, said the Institute proposed to extend its research on the poor breadmaking qualities of wheat grown in certain parts of Australia, particularly areas in Victoria, southern New South Wales, and Western Australia. Many Australian wheats, even with reasonably high protein content, had poor baking qualities.

Also, with a decrease in the protein content of certain wheats, abnormal qualities developed which rendered them unsuitable for breadmaking. Very little attention had been given to the baking quality, which was of major interest to buyer and consumer, but the need for some simple form of segregation of Australian wheat had been recognised for some years.

The Commonwealth Bank has approved grants totalling £A53,655 for promoting primary production throughout Australia. Half the profits of the bank's rural credits department are paid to the fund each year to aid production. Australian universities will receive £A41,800 to help meet the costs of investigation into pasture improvement, cereal rust, veterinary science, and other problems of interest to the farmer.

Bergen's New Fish Centre

The £1,350,000 fish storage and distribution centre at Bergen, Norway, said to be the biggest of its kind in northern Europe, has been formally opened. Occupying more than 250,000 sq. ft. of floor space, this modern six-storey building, with its own quays and with direct access to rail and road transport, has a freezing capacity for 12,000 tons of fish at the rate of 650 tons a day. An ice plant can supply up to 200 tons of ice a day.

Canned Bamboo Shoots as Food

The Central Food Technological Research Institute, Mysore, India, has perfected a process for the preservation and canning of bamboo shoots for edible purposes.

There are vast areas of bamboo forests to draw upon in Assam, Bengal, Bihar, Hyderabad, Madhya Pradesh, Madras, Mysore, Orissa, and Travancore-Cochin. In many of the bamboo clumps, curved or misshapen shoots are formed which do not grow well and are wasted. The tender parts of these shoots can be preserved in brine for conversion into bamboo pickles or curried vegetable, for sale in local or distant markets.

Eighteen inch to two feet long shoots are taken, the leafy sheaths removed, the tender portion cut into pieces of suitable size, and boiled in water for about half an hour, after which they are ready for canning.

Canned Guava Juice

In the Western Cape fruit farming areas, guava growers have been given a great deal of encouragement in recent months by the first commercial production of canned guava juice. The guava is of great nutritive value owing to its high content of vitamin C, but has been neglected in the past, owing to its high seed content and the indifferent reception given to the canned fruit in Britain. One variety of guava, the F. Malherbe, contains 900 to 1,000 mg. per 100 g. of fruit, the Rousseau 500 to 600 mg., while even the poorest types contain at least 200 mg., which compares favourably with the vitamin C content of citrus fruit.

The Western Province Fruit Research Station at Stellenbosch has devoted considerable research to the guava and as a result of extensive tests, production of canned juice was recently commenced at Ceres, followed by at least two other fruit processing factories.

Improved guava varieties developed at the Research Station, containing minimum amounts of the pip, bearing inner flesh, and possessing enhanced flavour and other qualities, will shortly be available.

No More Stale Bread

After several years' research a workable and economic method has been devised by Arnold Bakers of New York for quick freezing bread.

It was Admiral Byrd who encouraged Arnold to undertake experiments with quick frozen bread. Byrd had left an ordinary loaf of bread on a table in a hut buried under 20 ft. of snow, the temperature inside being −20° F. When Byrd returned to the Antarctic four years later, the bread was found to be in excellent condition.

The advantages of quick frozen bread are manifold. Returns by grocers will be eliminated; this should help to reduce the price of bread. Bread can now be sent to those regions suffering from famine and where there is malnutrition. Bakers will be able to work on slack days, overtime thereby being considerably reduced.

Under the present distribution system, packaged bread reaches the consumer about 12 hours after baking. Deep frozen bread will be shipped in refrigerated trucks and placed in the shop's own deep freeze equipment.

Immediately after baking, the bread is frozen in its wrapper at about −20° F., and stored at 0° F.

Frozen bread may be kept for months without mould formation. The one drawback is that defreezing in the wrapper takes about four hours, as the moisture has to be given time to distribute itself.

Sandwiches can be kept, after quick freezing, at 0° F. for as long as four months.

South African Sea-food Industries

Two new industries based on products of the coastal waters of the Western Cape have recently been established.

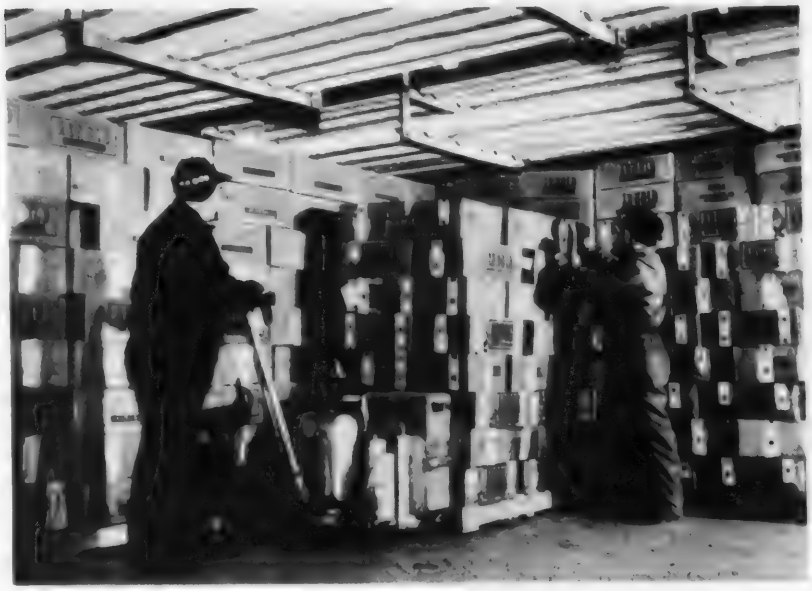
The abalone, or perlemoen, a large shell-fish which grows in shallow water round the Cape coast, has suddenly become of economic importance owing to demand from local canning factories. It is now being collected by teams of divers operating from fishing craft or from the shore at low tide. A skilled diver is able to bring up 500 or more shell-fish daily and as payment is at the rate of 3d. to 5d. for each abalone, an experienced man can earn a good income.

The canned product is exported chiefly to far Eastern countries, such as Malaya, where it is regarded as a great delicacy.

Because of the increased demand, there is a serious danger of overfishing, many easily accessible shallow banks having already been denuded. Steps are now being taken to control the industry by the Government Fisheries Division; new regulations are shortly expected to lay down a minimum diameter below which the young shell-fish may not be lifted, and commercial collecting will be prohibited except by diving from boats.

Another novel food product now being offered to the South African public has a seaweed base. In powder form, it is stated to contain valuable mineral salts and is recommended as a diet supplement. Research was carried out at Stellenbosch on the nutritive value of the powder and commercial production is now in operation in a factory at Onrust River, near Hermanus, using seaweed harvested locally. For some time past, animal feed supplements have been manufactured from the seaweed by a process of cleaning, drying, and grinding, but so far as is known, this is the first time that a seaweed product of this nature has been offered for human consumption. The powder is of pleasant odour and can be used by sprinkling on or cooking with other foods.

A typical analysis of a common Cape seaweed *Ecklonia* shows an appreciable content of nearly 20 different trace elements, apart from the normal salts of potassium, sodium, calcium, and magnesium.



Cartons of quick frozen Arnold breads are placed on pallets and stored at 0° F. in the refrigerated warehouse.

Fish Factory at Killybegs

The Irish Fisheries Board has built a fish processing factory at Killybegs, Co. Donegal, equipped with the latest British, German, and Danish machinery for quick freezing and cold storage of fish for kippering and filleting. An electrically powered mechanical kiln at the factory is capable of producing 300 tons of kippers in an operating season of 30 weeks.

Built at a cost of £60,000, fish meal for animal and poultry feeding will also be manufactured, in addition to the smoking of cod and haddock.

Ladder for Salmon

A salmon ladder, claimed to be the biggest in Northern Europe, is to be constructed in the Rana river, North Norway, at a cost of £15,800. The ladder will help the salmon to scale a waterfall which hitherto has prevented them from proceeding more than a few miles up the river. When the ladder is ready, the salmon will be able to proceed about 50 miles up river. The installation of the ladder should, the authorities estimate, increase the salmon yield in Rana river to about 150,000 lb. a year.

Grain Whisky in N. Ireland

An £80,000 plant has been installed by Boyd and Company Distillers, Coleraine, thus reviving, after a period of 20 years, the distillation of grain whisky in Northern Ireland. An impressive part of the new plant, installed by a Glasgow firm of coppersmiths, is the £20,000 still, based on an invention by the Irish customs officer Coffey in 1830. It will produce whisky at the rate of 100 proof gallons an hour, the distilling process occupying a week.

The last grain whisky made in the North of Ireland was at Dunville's Belfast Distillery in 1933-34. Since then more than 30 northern blending firms have had to depend on outside sources for supplies as only two other distilleries in Ireland are making this type of spirit. Both of them, the Cork Distilleries Company and B. Daly and Company, are in the Republic.

Grain whisky is used for extending or blending with malt or pot still whisky, and after the spirit now being produced has matured properly it will form an important part of the export trade.

More New Zealand Meat

In the next four or five years, New Zealand production of beef will be double the 1939 figure and over 10 or 15 years it will double again, according to Mr. P. J. Borthwick, managing director of Borthwicks (Australia) Ltd.

He said that he could see no reason why mutton production should not increase by 50 per cent. over the same period, but all these additional supplies for export would necessitate improved harbour facilities.

Larger meat production was the outcome of increased aerial top dressing, which was already increasing the land's carrying capacity.

Whale Oil Hauls

The nine Norwegian whaling expeditions to the Antarctic produced altogether 929,077 barrels of whale oil. This is equivalent to about 155,000 tons, and at an average price of about £68 a ton, whale oil earnings by Norwegian expeditions should amount to about £10,500,000. Production this year is almost 200,000 barrels more than last year, but the number of expeditions operating last year was only seven as against nine this year. Apart from whale oil, the Norwegian expeditions have produced 31,135 barrels of sperm oil, compared with 27,317 barrels last year. This year for the first time the whaling companies agreed to limit the number of catcher boats attached to each expedition. Because good results have been achieved despite the limitation of catcher boats, whaling circles in Norway believe that a similar limitation will be agreed next year.

OVERSEAS ENQUIRIES

Sardines and Herrings

Sres. J. A. Aracena, Edificio Diez, Ciudad Trujillo, Dominican Republic, have expressed an interest in contacting United Kingdom exporters of sardines and herrings.

United Kingdom firms interested in this enquiry should write direct by air mail to Sres. J. A. Aracena at the address shown above, submitting full particulars of their products, together with price lists.

*

Jams, Jellies, and Mincemeat

Needlers British Imports, 425, 14th Street, Denver, Colorado, have expressed an interest in receiving quotations from United Kingdom suppliers of jams, jellies, and mincemeat, which should be packed in 3 oz. decorated glass jars with screw lids, the jars to be packed six to a cardboard box suitable for gifts.

United Kingdom firms interested in this enquiry are asked to write direct to Mr. Bennett Needler at the address given, submitting quotations f.o.b. preferably in U.S. dollars.

In order to avoid the possibility of damage in transit, it is essential to ensure that any samples sent by post are carefully and securely packed. Duty is normally payable on samples imported into the U.S.A. unless the value does not exceed one dollar.

*

Soya Beans, Castor Seeds, etc.

Gustav Thode, Hamburg-Blankenese, Blankeneser Bahnhofstrasse, 18, would like to represent United Kingdom suppliers of soya beans, castor seeds, sesame seeds, groundnut kernels, palm kernels, copra, oilcake from those oilseeds, and manioc meal.

United Kingdom suppliers interested in this enquiry should communicate direct with Herr Gustav Thode at the address shown above and should quote c.i.f. prices Hamburg giving details as to deliveries, terms, etc.

*

Canned Food Products

Unecor Sales Company, 401 Broadway, New York City 13, N.Y., wishes to represent canners of mackerel in natural sauce packed in 48 15 oz. (net) tins, including reasonable amount of salt brine lobster meat in three, six, and 12 oz. net tins, all packed in strong double strapped export cartons. Quote c.i.f. prices Atlantic coast, Gulf and Pacific coast ports of the U.S. The company is also interested in other types of sea foods, and canned meat and pork products.

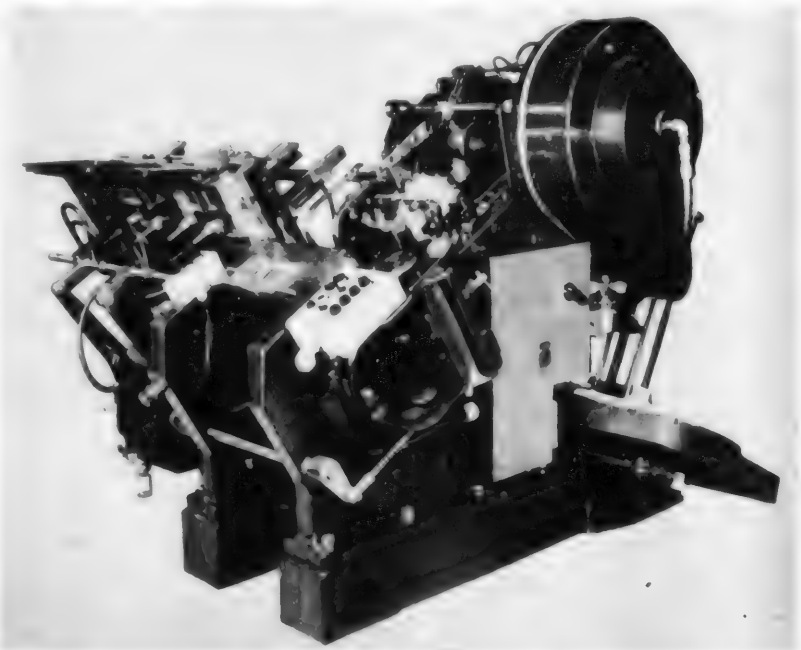
Since the goods will be required for consumption in the United States, the quality and labels will have to comply with the regulations of the U.S. Food and Drug Administration.

Full particulars are requested as to quantities (the larger the better), packing, description, shipments, labels, prices to include the standard brokerage (state percentage), and terms of payment.

Exhibits at U.S. Canners' Show

A completely new automatic strip feed press was exhibited by E. W. Bliss Company at the 1954 Canners' Show in Atlantic City. Used to produce sanitary can ends and closures, the press was designed from the ground up for high-speed operation. In long test runs at the Bliss plant in Hastings, Michigan, the press has operated satisfactorily at speeds beyond 300 strokes per minute. The following features have been included in the design to facilitate continuous operation at high speed and to minimise vibration and maintenance: combination disc friction clutch and brake, balanced crankshaft, feed bar, driven positively by crank instead of lever, has adjustable fingers, elimination of idle stroke between strips, increase in bolster area, and press timing which allows slide to stop automatically at top of stroke.

In conjunction with the new strip feed press, the company also exhibited a new automatic double-end curler used to curl can ends. Its use permits improved curling by giving 270° of curling time for each can end. Larger curling wheels add to the curling time. The machine, which has extra heavy bearings and is equipped with an individual motor drive, is adjustable to accommodate can ends ranging in size from 202 to 404.



The Bliss automatic strip feed press for the production of sanitary can ends and closures.

News from the Ministries

Appointments

Mr. A. R. Manktelow, C.B., has been appointed a Deputy Secretary of the Ministry of Agriculture and Fisheries in succession to Sir Reginald Franklin. Mr. C. H. M. Wilcox, Under Secretary, has been appointed Principal Finance Officer in succession to Mr. Manktelow.

Butter and Cheese Imports

Private imports of butter and the types of natural cheese (Cheddar, Cheshire, Derbyshire, Dunlop, Lancashire, Leicestershire, and White Wensleydale) are now permitted.

The Open General Licence has been extended and amended so as to permit without specific licence, the import of butter, butterfat, and ghee, and the types of cheese mentioned above, if originating in and consigned from any country or territory other than:

(*a*) Bolivia, Canada, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, French Somaliland, Guatemala, Haiti, Republic of Honduras, Liberia, Mexico, Nicaragua, Panama, Philippines, Tangier, United States of America, Venezuela.

(*b*) Albania, Argentina, Bulgaria, Czechoslovakia, Germany (Russian Zone), Hungary, Japan, Korea, Persia, Poland, Roumania, Union of Soviet Socialist Republics.

Licences to import butter and cheese after May 8, 1954, from the countries listed in (*b*) will be issued in accordance with any arrangements that may be entered into with particular supplying countries.

Arrangements for imports of cheese from the countries listed in (*a*) will be announced later.

Milk Technical Advisory Committee

The Minister of Food, the Minister of Agriculture and Fisheries, and the Secretary of State for Scotland have appointed a Milk and Milk Products Technical Advisory Committee with the following terms of reference: "To keep under review the technical problems arising at all stages of the handling, processing, and distribution of milk and the manufacture of milk products; to inform the Ministers of the problems requiring research and of desirable technical developments; and to advise on the best means of encouraging the adoption of such developments in the dairy industry."

The Committee will recommend the Ministers to make the necessary arrangements for such research as seems required by the Agricultural Research Council, the Medical Research Council, the Department of Scientific and Industrial Research, or other appropriate scientific bodies, and to seek the collaboration of commercial or other interests.

The membership of the Committee is as follows:

Chairman: Prof. H. D. Kay, C.B.E., D.Sc., F.R.S., Director of the National Institute for Research in Dairying.

Mr. W. G. Alexander, O.B.E., of the Agricultural Research Council.

Mr. J. G. Carnochan, Director of Milk Division, Ministry of Food.

Mr. C. H. Chalmers, Chief Milk Inspector, Department of Health for Scotland.

Mr. S. Clifford, O.B.E., chairman of the Central Milk Distributive Committee.

Prof. E. L. Crossley, of the Society of Dairy Technology.

Mr. J. L. Davies, C.B.E., of the Milk Marketing Board of England and Wales.

Mr. H. S. Hall, of the National Institute for Research in Dairying.

Mr. J. G. Inglis, representing the three Milk Marketing Boards in Scotland.

Dr. C. H. Lee, of the Low Temperature Research Station, Department of Scientific and Industrial Research.

Mr. P. K. Mackenzie, of the Dairy Engineers' Association.

Mr. A. C. McMillan, of the Scottish Milk Consultative Committee.

Mr. G. T. Morgan, Chief Milk Production Advisory Officer, Ministry of Agriculture and Fisheries.

Mr. C. A. Scarlett, of the Ministry of Agriculture and Fisheries.

Dr. R. Waite, of the Hannah Dairy Research Institute.

Mr. F. C. White, of Milk Products Division, Ministry of Food.

Dr. Norman C. Wright, Chief Scientific Adviser of the Ministry of Food.

The Ministry of Health, the Department of Agriculture for Scotland, the Ministry of Agriculture for Northern Ireland, Food Hygiene Division of the Ministry of Food, and the Public Health Laboratory Service will be represented on the Committee when matters of concern to them are considered.

The Joint Secretaries of the Committee are Mr. G. W. Ford, Milk Division, Ministry of Food, Thames Ditton, Surrey, and Mr. R. Harding Wynn, Ministry of Agriculture and Fisheries, 4-10, Chester Terrace, Regent's Park, London, N.W.1. The address of the Milk and Milk Products Technical Advisory Committee is c/o Milk Division, Ministry of Food, Giggs Hill Green, Thames Ditton, Surrey.

Irish Livestock and Meat

Further talks on future arrangements for the trade in Irish livestock and meat when meat is decontrolled in July have taken place in London. The Minister of Food, Major the Rt. Hon. Gwilym Lloyd-George, M.P., and the Parliamentary Secretary to the Ministry of Agriculture, Mr. G. R. Nugent, M.P., met Mr. Sean F. Lemass, the Deputy Prime Minister and Minister for Industry and Commerce of the Irish Republic, and Mr. Thomas Walsh, Minister of Agriculture in the Irish Republic.

Major Lloyd-George informed the Irish Ministers that the British Government is willing to make special provision for Irish bred store stock fattened in this country. Such stock will be eligible for the same individual guarantee as home bred stock, but any collective guarantee payment due would be abated by up to 4s. 6d. per cwt. on steers, heifers, and special young cows and by up to ¾d. per lb. dressed carcass weight on sheep and lambs.

The period during which Irish store cattle must be in the United Kingdom before becoming eligible for the guarantee will continue to be two months as at present and the position in this respect will be reviewed in consultation with the Government of the Irish Republic in a year's time. A similar period will apply to store sheep.

Any fat cows eligible for the guarantee which were originally imported from the Irish Republic will be eligible for the same guarantee payments as home bred cows. This also will be reviewed in a year's time. The Irish trade in pigs and bacon is at present subject to an agreement which does not expire until 1956 and official discussions will continue on the application of the agreement after decontrol.

Imports from Western Europe

Arrangements for import quotas from Western Europe and certain other countries for the second half of 1954 have now been made, and are substantially unchanged.

Opportunity has been taken to make a few minor additions, beginning May 9, 1954, to the list of goods which may be imported from Western Europe and certain other countries without quantitative restriction.

Details of the goods and the countries involved are given in Notices to Importers Nos. 644 and 643, issued by the B.o.T. Import Licensing Branch.

Exporting to Canada

For those exporters interested in the Canadian market, a revised edition of "Exporting to Canada" has been published by H.M.S.O. (price 3s., by post 3s. 2½d.). This booklet, which follows the same lines as the edition published in 1951, has been brought up to date.

It contains chapters dealing with the characteristics of the Canadian market, initial steps to be taken in examining the market, selling and distribution, sales promotion, conduct of business, standards and specifications, Canadian Government regulations, and guarantees against export losses.

Information and Advice

This Service is available to subscribers to FOOD MANUFACTURE. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.

Bun Making

B.7012. *We should be obliged if you would let us have a method for making buns.* (Herts.)

Buns are usually made by preparing a ferment preparatory to dough making. A breadmaking flour is more suitable for the production of buns than is a cake flour. A suitable method would be to make a ferment with the following ingredients:

Water	1 quart
Milk powder	2 oz.
Sugar	2 oz.
Yeast	3 oz.
Flour	8 oz.

This ferment should have a temperature of 90°F. and should be left for half an hour. It should then be doughed up by adding the following:

Flour	4 lb.
Salt	½ oz.
Fat	12 oz.
Sugar	10 oz.
Currants	1 lb.

The resulting dough should be allowed to ferment for 90 minutes at a temperature of from 80° to 82°F. A lower temperature with a higher proportion of yeast is preferable to the use of a higher temperature. In the early stages of fermentation, the dough should be knocked-back in order to prevent chilling, and it is advisable to perform this operation once every 20 minutes. The final proving is performed in steam at about 88°F. The buns are baked at a temperature of from 420° to 460°F.

Vanilla Fudge

B.7017. *Could you please provide us with a formula for fudge?* (Northumberland)

The following is a formula for vanilla fudge, but a wide range of flavours may be substituted for vanillin:

Tate's Grade 30 pieces	35 lb.
Corn syrup	18 ,,
Fondant base	25 ,,
Condensed milk	25 ,,
Hard fat (hard palm kernel oil)	10 ,,
Vanillin	1 oz.

The melted fat, sugar, corn syrup, and condensed milk are pre-mixed thoroughly, placed in a steam stirring pan, and cooked at 100 lb. steam pressure to 240°F. The steam is turned off and the batch cooled to 200°F., and the fondant and vanillin are added. The latter ingredients are allowed to beat well through the batch, which is poured on to oiled cooling slabs or in oiled tin trays. The mass quickly grains. It is then cut into pieces of required size. Fudge may be scored while still firmly plastic, and finally broken when set.

The following are the ingredients and method for making the fondant base which is incorporated in the above formula:

Granulated sugar	224 lb.
Corn syrup	56 ,,
Cream of tartar	½ oz.

The sugar is placed with 8 gal. of water in the steam syruping pan of a fondant machine. It is dissolved thoroughly, so that no isolated crystals of sugar are left adhering to the sides of the pan. The corn syrup is added and brought to simmering point, any surface scum being taken off. The syrup should test 30° Baumé at boiling point. It is then pumped into the fondant machine and cooked to 240°F. This temperature is variable, according to the degree of stiffness of fondant required. The cooked syrup is cooled to 90°-100°F. and beaten. The resultant fondant base is allowed to mature for at least 48 hours before using. This allows the fondant to become more moist by a redistribution and equalisation of the moisture by diffusion and capillary action.

Coloured Sugar Vermicelli

B.6983. *We should be obliged if you could give us a formula for coloured sugar vermicelli.* (Scotland)

The following formula may be used as a basis for trial:

Finely ground icing sugar	108 lb.
Powdered gelatin	1 ,,
Powdered gum tragacanth	4 ,,
Water	2 gal.

The gum tragacanth is placed in the water in a whisking machine, and beaten until a smooth mucilage is obtained. This mucilage is passed through a fine sieve into a U-shaped mixing machine. The gelatin is dissolved in a little warm water and added to the mucilage. The machine is set in motion, and the ground sugar added gradually until a dough is obtained which will not stick to the fingers when tested.

The paste is passed through the perforated plate of an extruding machine to produce the threads of paste. These threads are drawn on to dusted trays, and placed in a warm air chamber to dry. When dry, the threads are broken up into small pieces, and placed, after sieving to eliminate dust, in a dragée pan. Sufficient syrup is added to wet the pieces thoroughly. A dusting of corn starch is given to the pieces, the operator using his hand to prevent the pieces from sticking together.

When the first charge is thoroughly dry, successive charges of syrup are added, repeating the process until the required thickness of coating has been achieved. The pieces are removed from the pan, and stored in the warm room until thoroughly dry. They are then returned to the pan, and given a final charge of coloured syrup only, and allowed to run until dry. They may be polished finally by adding pieces of beeswax to the pan, and being allowed to run until a gloss has been obtained.

Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.6999. *Peel dicing equipment.* (Ireland)
B.7000. *Emulsifiers for ice cream.* (Finland)
B.7001. *Apple canning.* (Ireland)
B.7004. *Marzipan and almond equipment.* (Lancs.)
B.7005. *Cellulose film sheets.* (Ireland)
B.7006. *Monosodium glutamate.* (London)
B.7008. *Bakers' milk chocolate.* (Berks.)
B.7009. *Bakery research.* (America)
B.7010. *Bakery and confectionery literature and equipment.* (Pakistan)
B.7013. *Mixers for jelly crystals.* (Israel)
B.7014. *Marmalade for diabetics.* (Sweden)
B.7016. *Pumping pickle for ham.* (London)
B.7018. *Agitating retorts for canned cream.* (Ireland)
B.7021. *Biscuit making equipment.* (India)
B.7022. *Table jellies.* (British West Indies)

Recent Patents

708,420. MASCHINENFABRIK STEINAU WOYTH AND CO.: Ice cream freezer.
708,440. LANYON, B. E. C.: Coating and draining of confectionery goods.
708,465. KUSTNER FRÈRES ET CIE. SOC ANON.: Machines for moulding plastic masses of edible material.
708,550. LISTON, S.: Means for de-panning loaves of bread and the like.
708,625. SOERENSEN, C. HILDEBRANDT-: Device for moulding articles of a plastic mass, particularly of dough.
708,600. GAUNT, J. G. (Louisiana State University and Agricultural and Mechanical College, Board of Supervisors of): Apparatus for separating pith from fibrous vegetable materials.
708,710. DE LAVAL SEPARATOR CO.: Centrifugal separators.
708,806. SCIENTIFIC AND INDUSTRIAL RESEARCH. HONORARY ADVISORY COUNCIL FOR: Undenatured gluten.
708,845. GENERAL FOODS CORPORATION: Coconut products.
708,940. UNILEVER, LTD.: Methods of and apparatus for measuring, recording, and controlling the degree of unsaturation of oils.
708,947. DAVIES, W. G. O.: Work feeding means for tunnel kilns or ovens.
708,992. P.S.S. (HOLDINGS), LTD.: Process for manufacturing soft impervious edible bodies useful for imitation soft fruit and the like.
709,034. PATERSON, J. C., and PATERSON, L.: Manufacture of laminated dough.
709,193. CASTLE FISHERIES, LTD.: Food products.
709,244. ATLAS POWDER CO.: Bloom inhibited chocolate.
709,641. COX, C. E.: Machines for moulding pastry and the like.
709,800. BOOGAARD, M.: Method for the separation of potato pulp into fibres on the one hand and starch particles in a liquid on the other, and a device for carrying out this method.
709,931. STANDARD BRANDS, INC.: Pudding compositions.

ABSTRACTS OF BRITISH PATENTS

Extracting Oil from Seeds

This relates to an improved apparatus for extracting liquid from liquid bearing material, such as oil from vegetable seeds, of the type in which the material is subjected to pressure in a ported cylinder by means of a rotating worm element displacing the material axially thereof.

An object of the invention is to provide a more efficient removal of the liquid content from the oil-bearing seed, dye-containing bark, or the like material, and to reduce the mechanical power necessary for the operating of the machine.

Material to be substantially relieved of its liquid content is fed to the annular space between a pair of coaxial cylinders, one or both of which is or are ported for the escape of liquid, and is subject to pressure therein while displaced axially thereof by means of a rotating cylindrical sleeve the lower end of which is contoured to form an impeller having a single convolution of single or multiple pitch.

706,683. *Gordon Wilson Macilwaine.*

British patents and trade marks have been selected from the "Official Journal of Patents" and the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.

Liquid Measurement

In this specification is described a combined hydrometric and capacitative device responsive to the dielectric constant and specific gravity of a liquid which can be used for measuring the weight of liquid in a container.

700,499. *The Liquidometer Corporation.*

Sugar Cubing Machine

A method for the continuous production of loaves or cubes of sugar consists in feeding damp sugar at a moulding station upon a travelling conveyor equipped with spaced transverse bars slotted for intersection at the moulding station. The moulded cubes pass from the moulding station each with two sides and one face exposed, and cause the conveyor subsequently to traverse a drying chamber wherein the cubes are dried prior to release from the conveyor.

The machine may consist essentially of a conveyor of the endless chain type of which the upper flight extends from the moulding station through a hot tunnel or chamber.

As the upper flight of the conveyor passes over sprockets at the outlet end of the drying tunnel or chamber, the cells or cubicles expand and the dry cubes are released.

Drying may be effected by resistance heaters suspended in the drying tunnel or chamber.

If infra-red heating is resorted to, provision may be made for introduction of infra-red lamps above and/or below the upper flight of the conveyor.

706,775. *The Mirrlees Watson Company Limited and Cyril Martindale.*

Meat Mincer and Vegetable Cutter

A meat mincer and vegetable chopper is described which includes a standard supported on a suitable base, a hopper releasably latched on the standard, a feed screw with operating handle therefor removably disposed in the hopper for rearward removal therefrom together, a set of meat mincing and vegetable cutting discs removably, interchangeably, and reversibly attachable to the feed screw at its discharge end and co-operable with a mincing and cutting disc fixed on the hopper at its outlet, and, preferably, manually operable means on the base for releasably anchoring the base to the flat top of a support.

706,540. *Rival Manufacturing Co.*

Apparatus for Treating Meat

A novel apparatus is described for distributing by injection a treating or curing liquid substantially uniformly through a body of meat to be treated.

A hollow, apertured movably mounted needle is injected into the meat, and treating liquid is forced through the needle into the meat in predetermined volume in relation to the rate of penetration of the needle. The solution is forced through the needle by a positive displacement pump that is operated by a presser foot engaging the meat.

Another object is to provide an apparatus in which a plurality of needles is movable simultaneously into the meat each being individually supplied with treating liquid in proportion to their respective penetrations.

The body of meat to be treated is advanced step by step through the apparatus by reciprocation of a head carrying the needles. In this way liquid is injected into the meat at uniformly spaced points throughout its length and width to produce uniform treatment.

706,437. *Fred James Avery.*

Dough Dividing Machines

The chief object of this invention is to provide a new or improved construction of feed plunger and operating mechanism which is more efficient in operation and enables a greater control to be obtained of the machine.

The feed plunger comprises a piston rod slidable in a hollow piston rod formed with a gland at its forward end, the hollow piston rod being pivotally connected to the end of a main operating lever, oil or hydraulic fluid being contained in the hollow piston rod at the rear end of the piston rod, the oil acting as a cushion for the piston rod. An oil chamber is carried at the rear end of the hollow piston rod, and a spring loaded relief valve is provided between the hollow piston rod and the oil chamber.

706,761. *Oddy's (Engineers) Limited and Frederick William Oddy.*

Bread Manufacture

This invention relates to the manufacture of bread with untreated and unbleached flour, by making a straight dough with it in the usual way, and overmixing the dough at atmospheric pressure prior to fermentation for a period of from two to seven times that of the normal period of dough mixing.

The bread produced by this over-mixed dough method using untreated and unbleached flour is similar in volume, texture, and bleach to that made by the usual process from chemically bleached and improved flour.

706,942. *Joseph Rank Limited and James Gordon Hay.*

ABSTRACTS OF FOREIGN PATENTS

Continuous Hydrogenation of Sugars

A suspension of a sugar, *e.g.* glucose, is continuously fed into the lower end of a vertical reactor with a finely divided supported reduced nickel catalyst, maintaining a temperature of 150° to 165°C. Hydrogen is continuously introduced in the lower end under pressure maintaining a pressure in the reactor of 1,000 to 2,000 p.s.i.g. The reaction mixture containing the reduced sugar, *e.g.* sorbitol, is removed from the upper end of the reactor.

U.S. Patent 2,642,462. *L. Kasehagen.*

Fruit and Vegetable Container

A moulded pulp berry box (containing a small amount of phenol-formaldehyde resin) has outwardly sloping side walls and offsets which form shoulders to prevent jamming of the nested containers.

Canadian Patent 494,442. *Keyes Fibre Co. and W. E. Hatch.*

Trade Marks

JR.—705,868. Marmalade. **James Robertson and Sons, Preserve Manufacturers, Limited,** Golden Shred Works, 8, Stevenson Street, Paisley, Scotland; Preserve Manufacturers.

BAXTER'S.—706,611. Jams, jellies (for food), marmalade, canned and bottled chicken, dead game, meat products for food, canned and bottled fruits in syrup; pickles and canned soups, all for sale in Great Britain. **W. A. Baxter and Sons, Limited,** The Northern Preserve Works, Fochabers, Morayshire, Scotland; Manufacturers.

CARNIVAL.—710,022. Chocolate biscuits. **Facchino's Biscuits, Limited,** Bromford Lane, Ward End, Birmingham, 8; Manufacturers and Merchants.

DOWLINGS.—715,729. Chocolate, chocolates, and non-medicated sugar confectionery, all for sale in England and Wales. **Dowlings Chocolates, Limited,** 5a, Eaton Road, Margate, Kent; Manufacturers and Merchants.

FRUITVALE.—722,296. Canned fruits. **Industrial Sugar Mills Pty., Limited** (a Joint Stock Company organised under the laws of the State of New South Wales), 259-261, Riley Street, Sydney, State of New South Wales, Commonwealth of Australia; Merchants.

KETTLEDRUM.—722,330. Biscuits (other than biscuits for animals). **Gray Dunn and Company, Limited,** 75, Stanley Street, Kinning Park, Glasgow, S.1; Manufacturers.

MIRASOL.—723,634. Fats for use as ingredients and as binding agents in the manufacture of meat products. **Jack de Miranda,** 96, Spuistraat, Amsterdam, Holland; and 20, Audley Court, Hampton Road, Twickenham, Middlesex; Merchant.

ALPHOL.—723,902. Margarine. **A. A. Mont, Limited,** also trading as **Alpha Margarine Company,** Brixham Road, Ayres Road, Old Trafford, Manchester, 16; Manufacturers.

PENNANT.—723,960. Meat; fish, poultry, and game (other than live fish, live poultry, and live game); canned, bottled and cooked fruits and vegetables; and meat extracts, eggs, milk, dairy products (for food), edible oils, edible fats, and pickles. **Danish Bacon Company, Limited,** 9-13, Cowcross Street, London, E.C.1; Wholesale Provision Merchants.

BROOKBERN.—723,986. Canned fruits. **Brookbern Lyrup, Limited** (a Joint Stock Company organised under the laws of the State of South Australia), Taplin Road, Loxton, South Australia, Commonwealth of Australia; Canners.

GIPSY.—724,050. Condensed milk. **Combined Food Producers, Limited,** Suffolk House, 5, Laurence Pountney Hill, London, E.C.4; Manufacturers.

YOYO.—724,097. Biscuits (other than biscuits for animals). **William MacDonald and Sons (Biscuits), Limited,** Glengarry Biscuit Bakery, Earl Haig Road, Hillington, Glasgow, S.W.2; Manufacturers.

TWENTY QUESTIONS.—724,262. Chocolate and sugar confectionery, none being medicated. **Irish Food Exporters, Limited** (a Joint Stock Company organised and existing under the laws of the Republic of Ireland), 2, Dawson Street, Dublin, Republic of Ireland; Manufacturers and Merchants.

GLUCOMAX.—724,288. Medicated beverages containing glucose. **Creamia Purified Milk Company, Limited,** 16b, Chaucer Road, Forest Gate, London, E.7; Manufacturers.

MERMAID.—724,290. Jams, table jellies (for food) and lemon cheese. **Nelson Preserving Company, Limited,** Nelson Factory, Long Lane, Aintree, Liverpool, 9; Manufacturers.

GLOBETTES.—724,802. Edible cake decorations. **The Globe Refining Company, Limited,** Eugene Street, Pennywell Road, St. Jude's, Bristol; Manufacturers.

MILLAM.—725,117. Canned meats. **Tieleman and Dros Commanditaire Venootschap op Aandelen** (a Limited Partnership existing under the laws of the Kingdom of the Netherlands) (personally responsible partner **Cornelis Willem Tieleman**), trading also as **Tieleman and Dros C.V.,** Middelstegracht 97, Leiden, Holland; Manufacturers and Merchants.

WHITE CAP.—725,313. Edible oils and edible fats, all for sale in the United Kingdom. **Van Den Berghs and Jurgens, Limited,** Unilever House, Blackfriars, London, E.C.4; Manufacturers.

TOORALAC.—725,353. Condensed milk, milk powder, buttermilk powder, whey powder, butter, cheese, malted milk, dried vegetables, fish and meat pastes. **British United Dairies Pty., Limited** (a Company incorporated under the laws of the State of Victoria, Commonwealth of Australia), 33-35, King Street, Melbourne, State of Victoria, Commonwealth of Australia; Manufacturers.

BROCHA.—725,397. Margarine. **M. Boxer and Sons, Limited,** 57-59, Commercial Street, London, E.1; Manufacturers.

New Companies

Southern Fats, Limited. (529486.) 310, Romford Road, Forest Gate, London, E.7. To carry on business of manufacturers and purifiers of and dealers in margarine, lard, oil, soap, and all kinds of edible and non-edible fats and greases. Nom. cap.: £5,000 in £1 shares. Dir.: J. A. Prior, Little Corston, Mountnessing, Essex.

T. J. Mahoney, Limited. (529495.) 61, Clare Road, Cardiff. To take over business of a manufacturing confectioner carried on at 2, Merches Place, and 61, Clare Road, Cardiff, by Thomas J. Mahoney as "Frank's Sweets." Nom. cap.: £6,000 in £1 shares. Dirs.: T. J. Mahoney, Mrs. F. Mahoney, Miss E. E. Mahoney, and Miss M. F. L. Mahoney, all of 10, Southcourt Road, Cardiff.

Delroy Confections Manufacturing, Limited. (529617.) 10, Coleman Street, London, E.C.2. To carry on business of manufacturers of and dealers in chocolates, confectionery, and ice cream. Nom. cap.: £100 in £1 shares. Dirs.: to be appointed by subs. Subs.: M. Gold, 21, Victor Villas, London, N.9 (coy. dir.), and M. Lewis, 84a, Aberdeen Park, London, N.5 (coy. sec.).

D. I. Jenkins and Son (Wholesale), Limited. (529698.) 14, The Parade, Chandlers Ford, Hants. To carry on business of manufacturers of and dealers in chocolates and confectionery, ice cream, biscuits, preserves, and similar sweetmeats. Nom. cap.: £3,000 in £1 shares (1,000 cum. pref.). Dirs.: D. I. Jenkins and Norah B. Jenkins, 14, The Parade, Chandlers Ford, Hants.

Rosart, Limited. (529749.) 313, High Street, West Bromwich. To carry on business of manufacturers of and dealers in confectionery and chocolates. Nom. cap.: £100 in £1 shares. Dirs.: A. R. Webber and Mrs. R. Webber, 25, Westbourne Avenue, Rhyl.

Supremex Food Products, Limited. (529752.) Nom. cap.: £100 in £1 shares. Dirs.: to be appointed by subs. Subs.: Jean Herbert (co. dir.), and Claire Moore (sec.), 128, Albany Street, London, N.W.1.

Topsy Foods, Limited. (529761.) 26-28, Hallam Street, London, W.1. Nom. cap.: £250 in 1s. shares. Permt. dirs.: T. T. C. Garratt and Patricia M. Garratt, Bibury, Broad Highway, Cobham, Surrey.

Thornton's Chocolate Kabins, Limited. (529813.) 22, Norfolk Row, Sheffield. To carry on business of confectioners, sweet and sweetmeat manufacturers, and sugar merchants. Nom. cap.: £2,000 in £1 shares (1,000 cum. pref.). Dirs.: W. N. Thornton and A. H. Thornton, 66, Whirlow Lane, Sheffield, and J. S. Thornton, Stanley Lodge, Matlock.

Anglo-South American Proteins, Limited. (529918.) 6-8, Crutched Friars, London, E.C.3. To carry on business of manufacturers of and dealers in animal and vegetable proteins, chemicals, metallurgical and other goods. Nom. cap.: £15,000 in £1 shares. Dirs.: C. E. Beardsley, 157, Monck Avenue, Norwood, Manitoba, Canada; W. N. Reif, 90, Langford Court, Abbey Road, London, N.W.8; G. E. Gould; P. B. Wachsmann, and Mrs. R. Wachsmann.

John R. Sorenson and Company, Limited. (529932.) To take over business of suppliers of bakers' and confectioners' sundries and yeast and produce merchants carried on by John R. Sorenson and Company (Holdings), Limited, at Soreen Buildings, Drake Street, Hulme, Manchester; to carry on business of bakers, cake and biscuit makers. Nom. cap.: £20,000 in £1 shares. J. R. Sorenson, Roselea, Altrincham Road, Baguley, Manchester, signs as director.

Aldrim Food Products, Limited. (529963.) Nom. cap.: £100 in £1 shares. Dirs.: to be appointed by subs. Subs.: Jean Herbert (co. dir.) and Claire Moore (sec.), 128, Albany Street, London, N.W.1.

Mapleton's Proprietaries, Limited. (530286.) To acquire goodwill and assets and liabilities of Mapleton's Nut Food Co., Ltd., and carry on business of nut and other food manufacturers. Nom. cap.: £100 in £1 shares. Dirs.: not named. Subs.: D. Whyatt and M. Moore, 71, Princess Street, Manchester, 2.

J. Dobson (Huddersfield), Limited. (530314.) 254, Deighton Road, Huddersfield. To carry on business of manufacturers of and dealers in boiled sweets, chocolates, biscuits, jams, and preserves. Nom. cap.: £17,500 in £1 shares. Dirs.: J. J. Carter and D. J. J. Carter, Snaithfield, Millhouses Lane, Sheffield, and D. del Strother Anthes, Overdale, Prospect Road, Totley Rise, Sheffield.

Redi-Wip, Limited. (530327.) 295, Regent Street, London, W.1. To manufacture, produce and deal in cream, milk, butter, cheese, and eggs. Nom. cap.: £5,000 in £1 shares. Dirs.: not named. Subs.: Evelyn G. Bourne (secy.), 100, Hayes Road, Bromley, Kent, and Rita M. Chester (clk.), 44, Woodend, Sutton, Surrey.

H. de Lacy Taylor, Limited. (530537.) Foundry Street, Cleckheaton, Yorks. To carry on business of manufacturers and retailers of sugar confectionery, sweets, chocolates, confectioneries, and foods. Nom. cap.: £500 in £1 shares. Permt. dirs.: H. de L. Taylor and Mrs. C. C. Taylor, The Dell, 12, Green Lane, Gomersal, Nr. Leeds.

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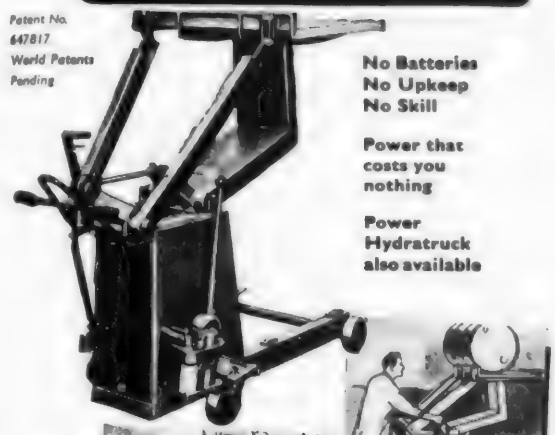

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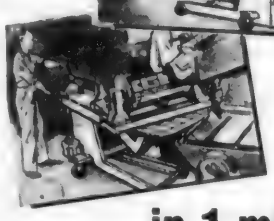

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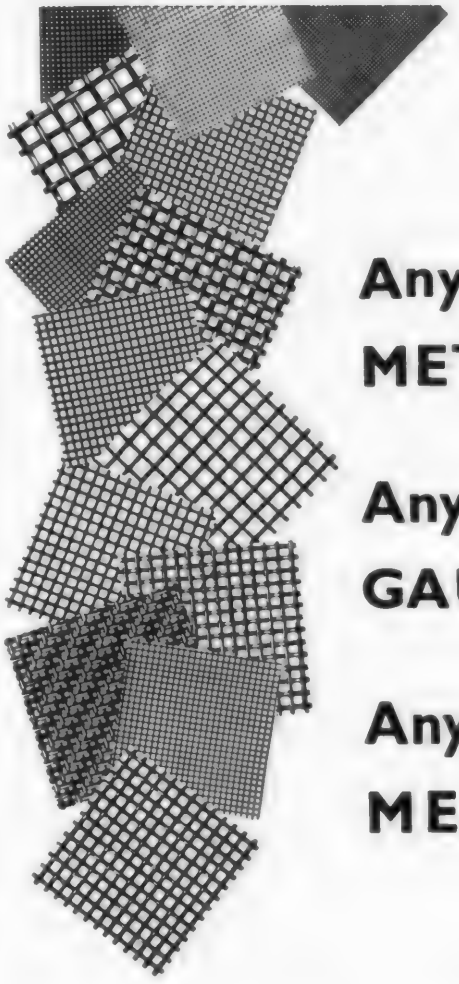

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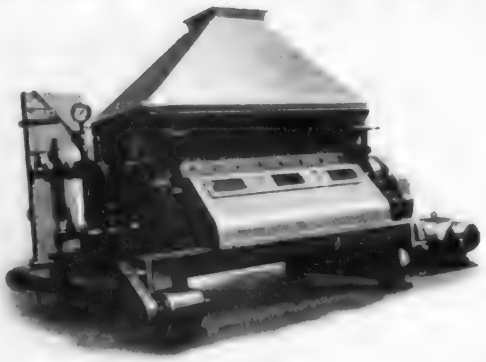

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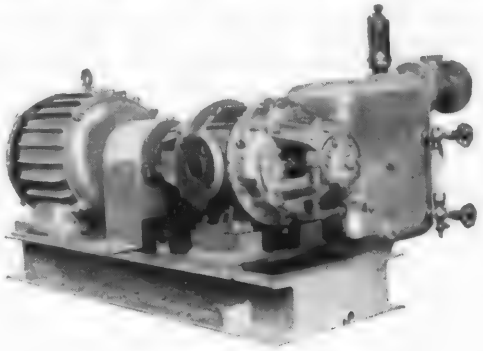

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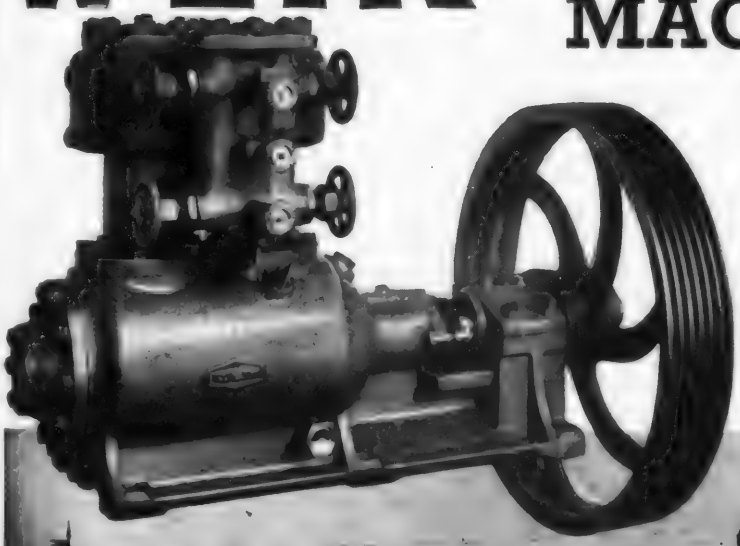

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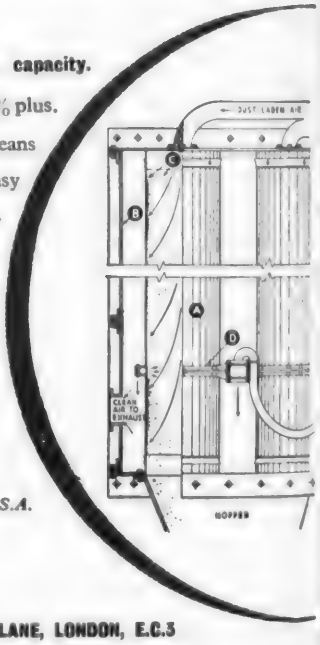

Diagram showing operation of the MIKRO-FIL UNIT — *Felt Bag (A) is clamped in housing (B). Dust-laden air enters from top (C). As the air passes through filter medium, dust deposited on inner surface of bag is dislodged by dual-action of cleaning ring (D). Cleaning is accomplished by counter-current of pressured air from ring and flexing of bag by ring as it moves up and down continuously.*

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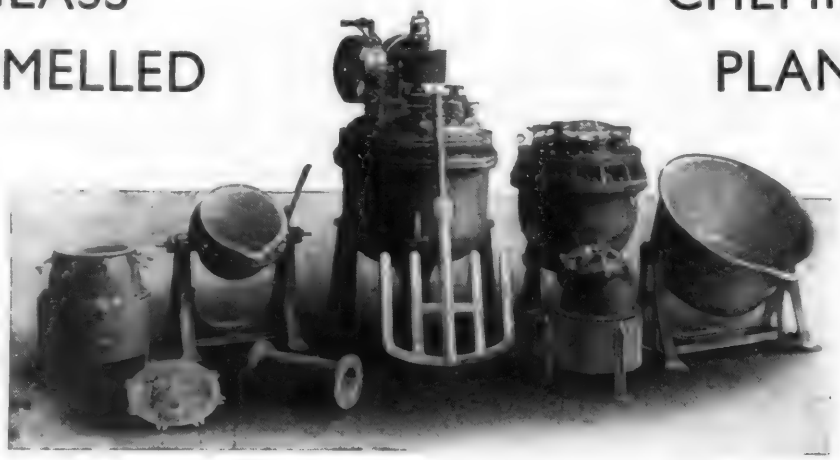

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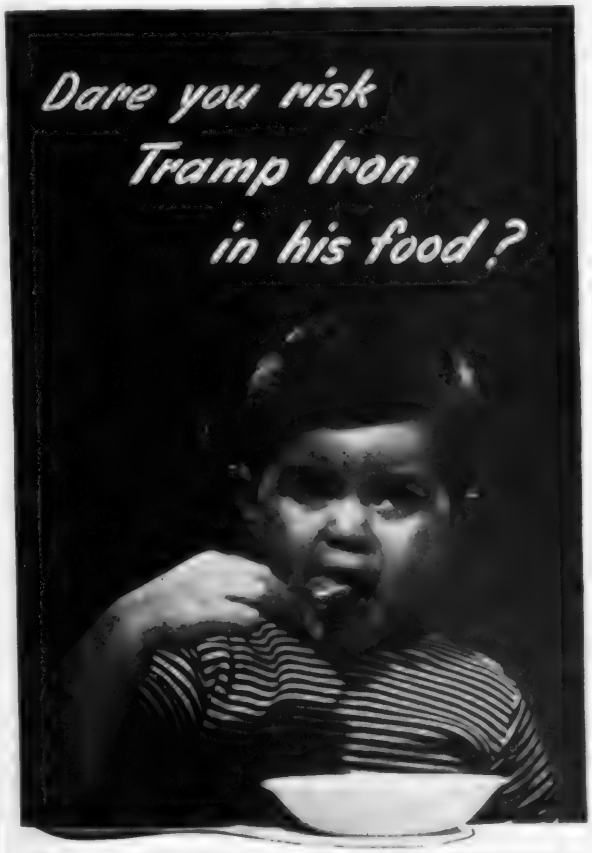

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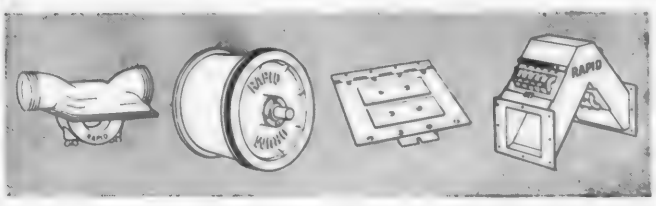

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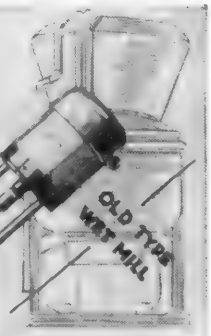

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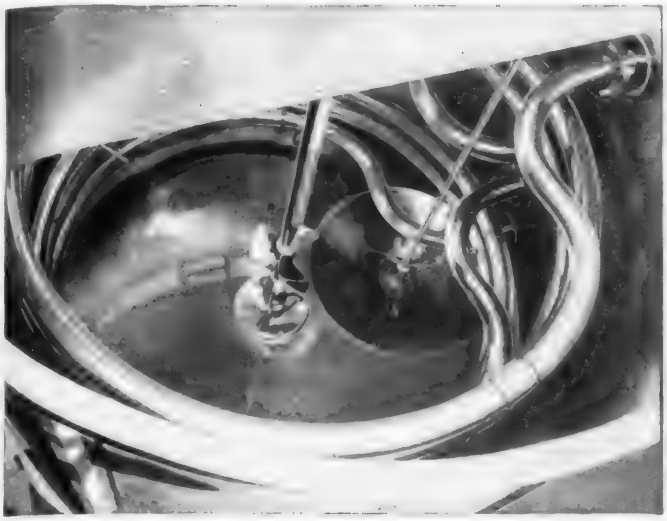

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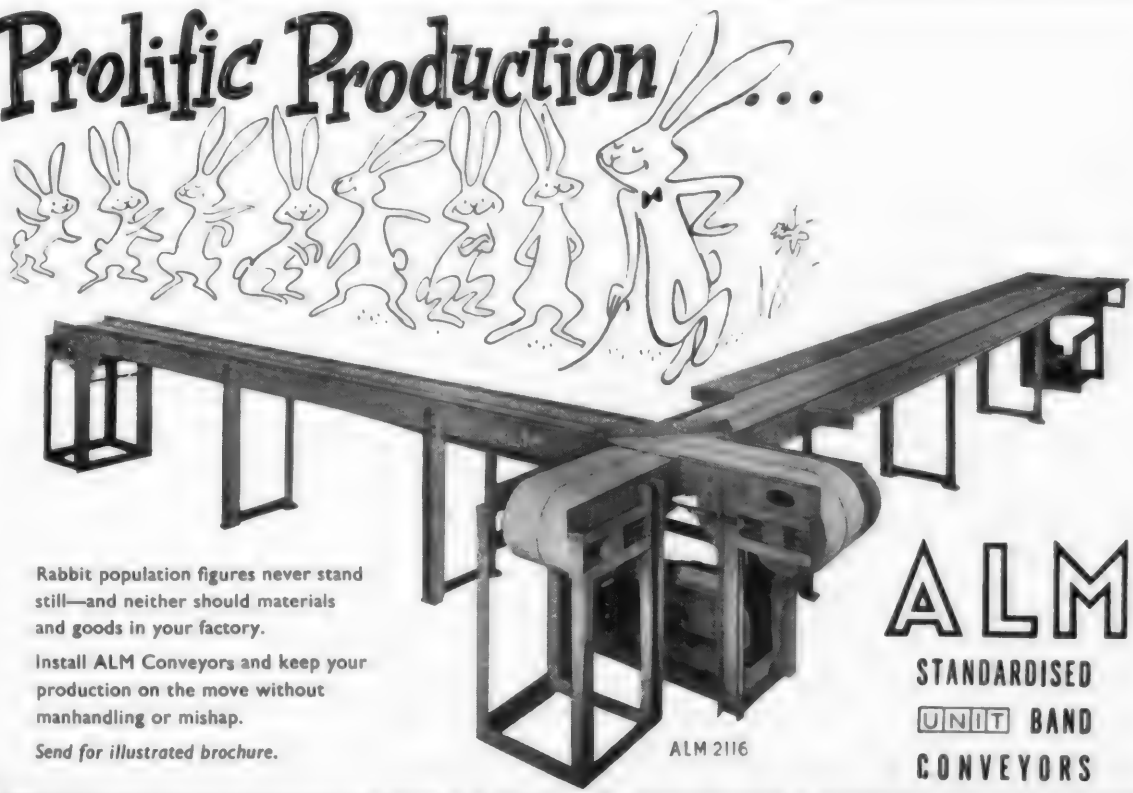

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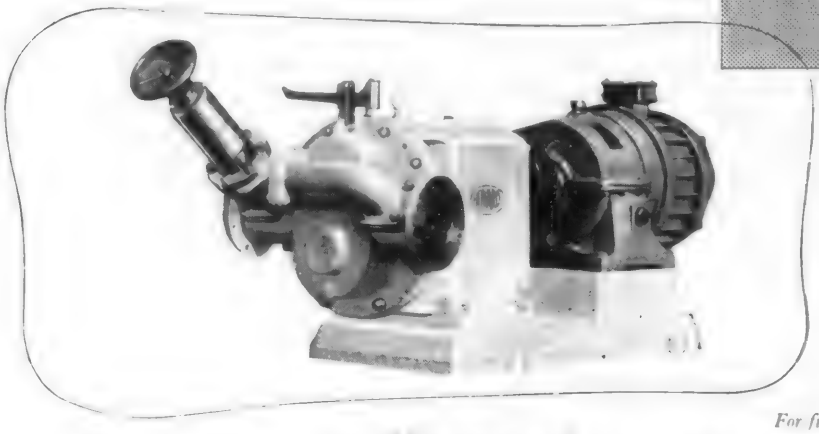

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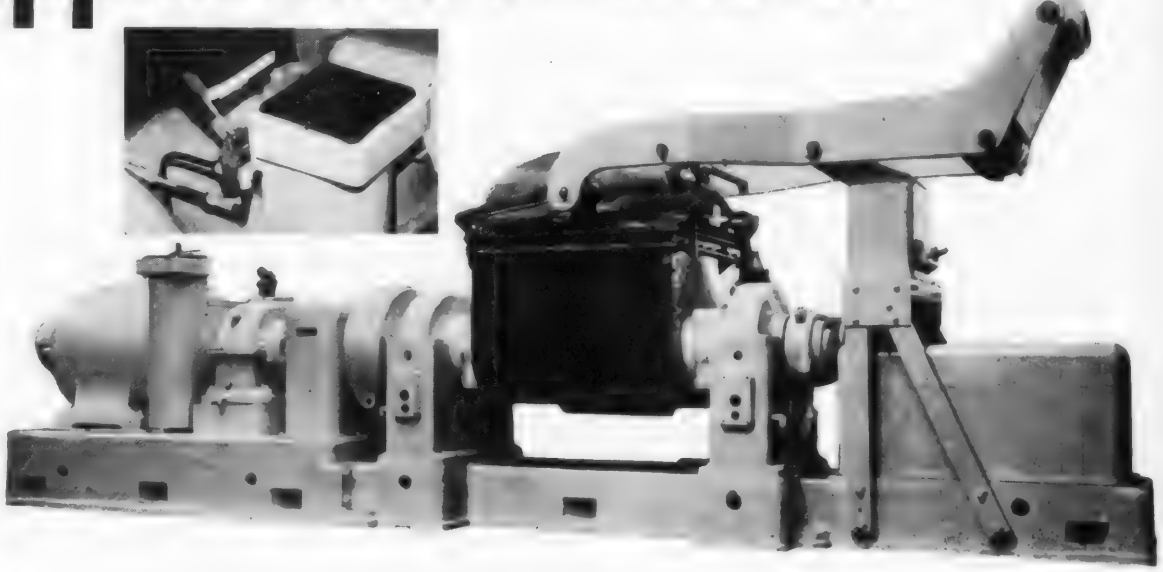

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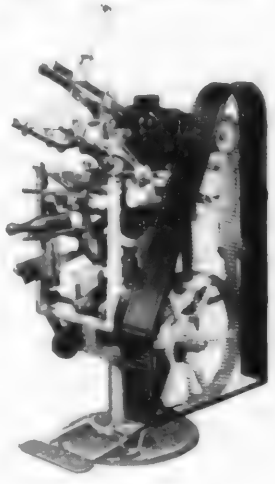

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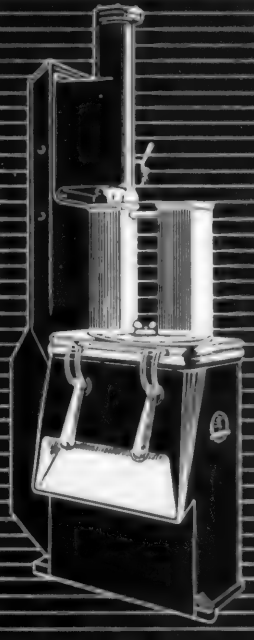

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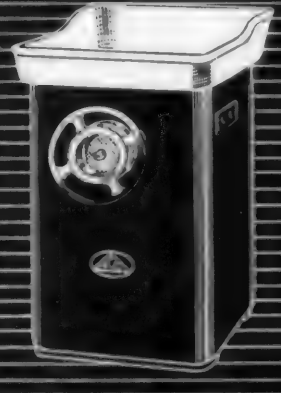

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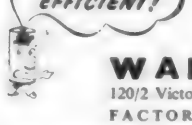

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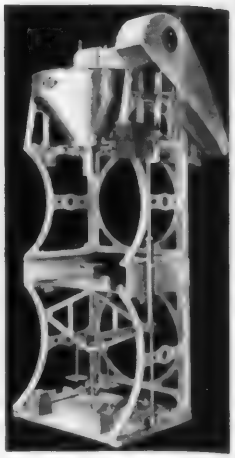

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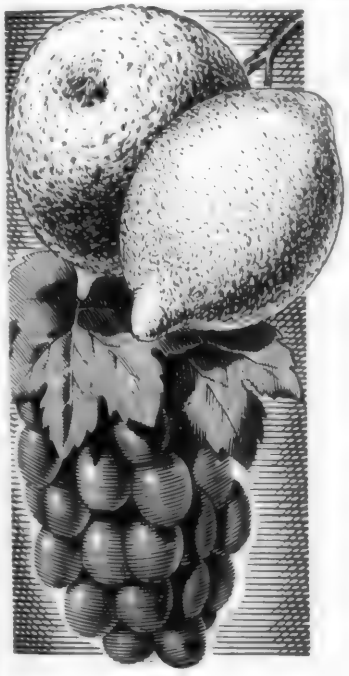

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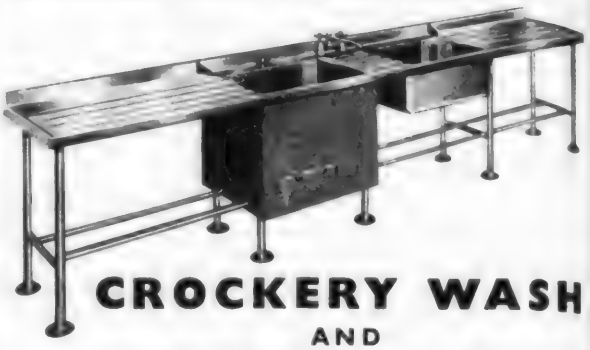

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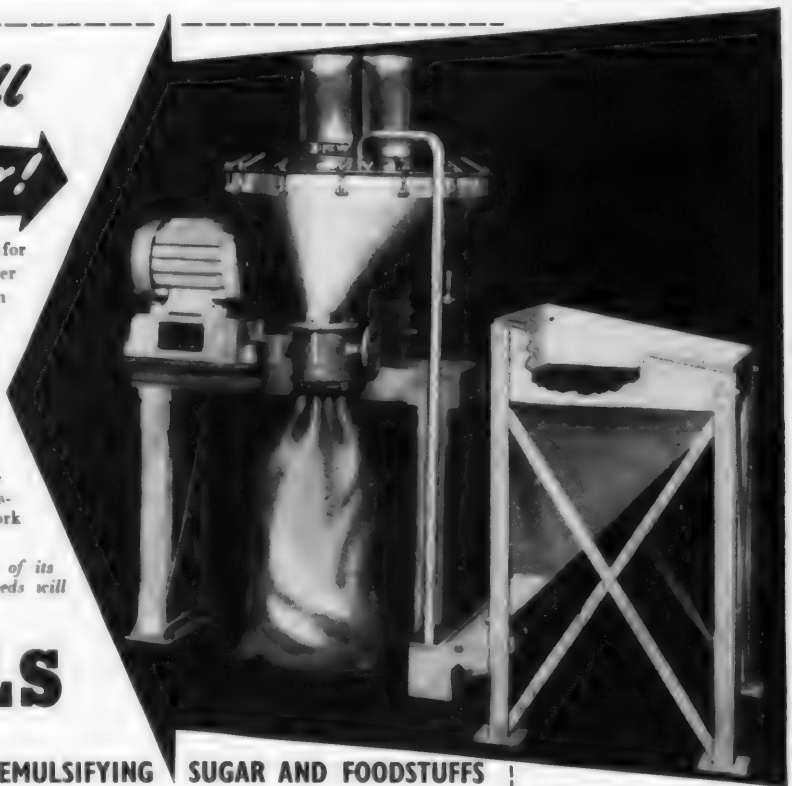

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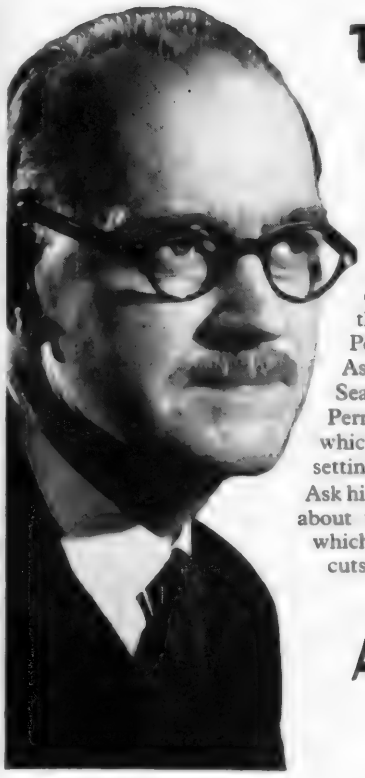

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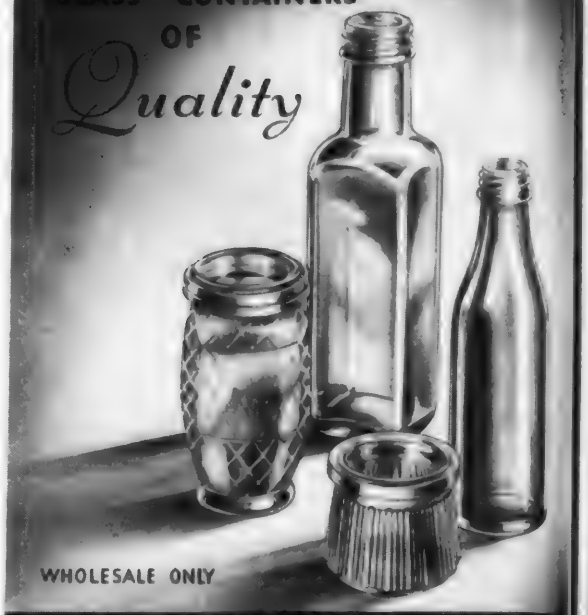

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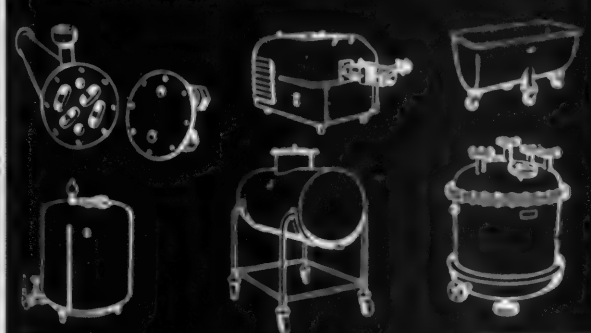

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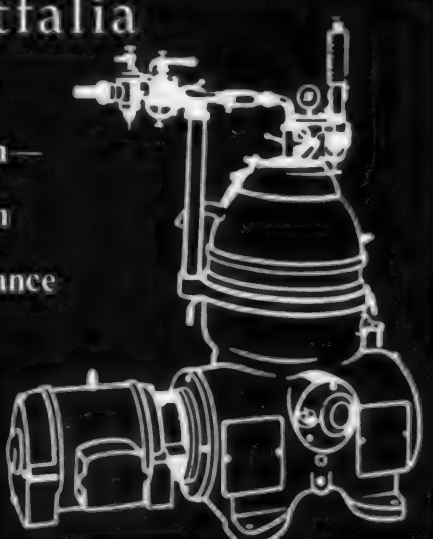

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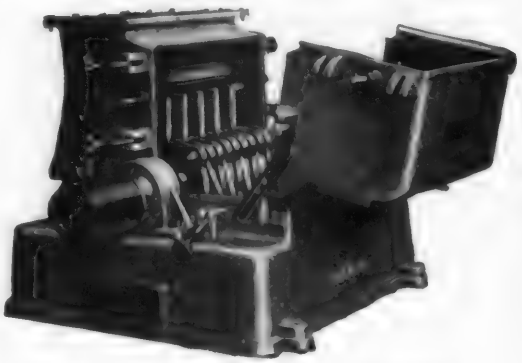

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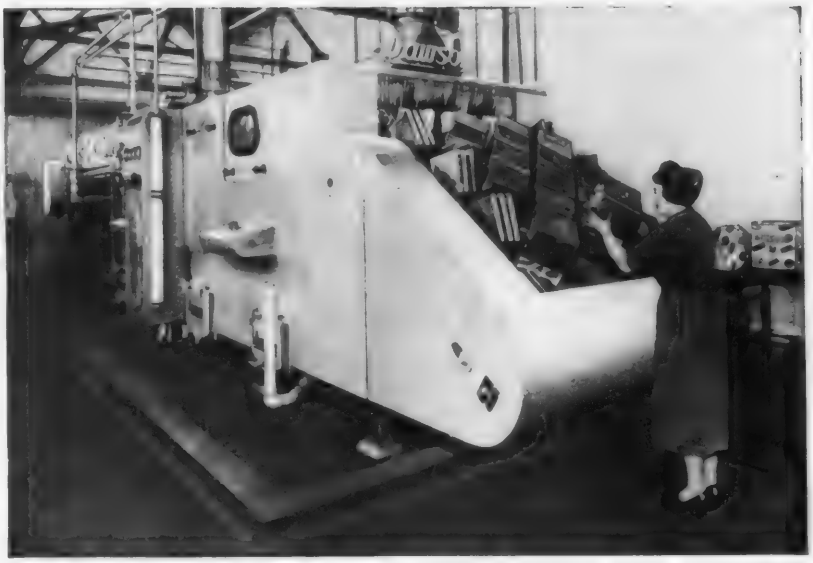

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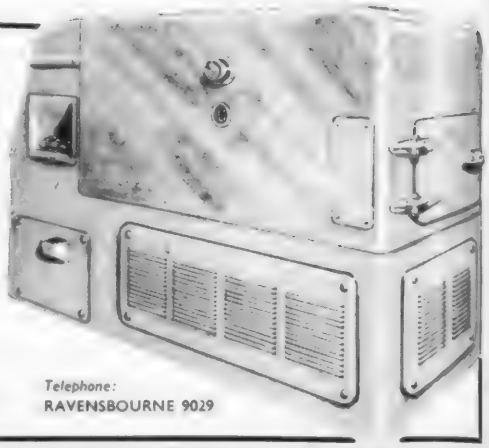

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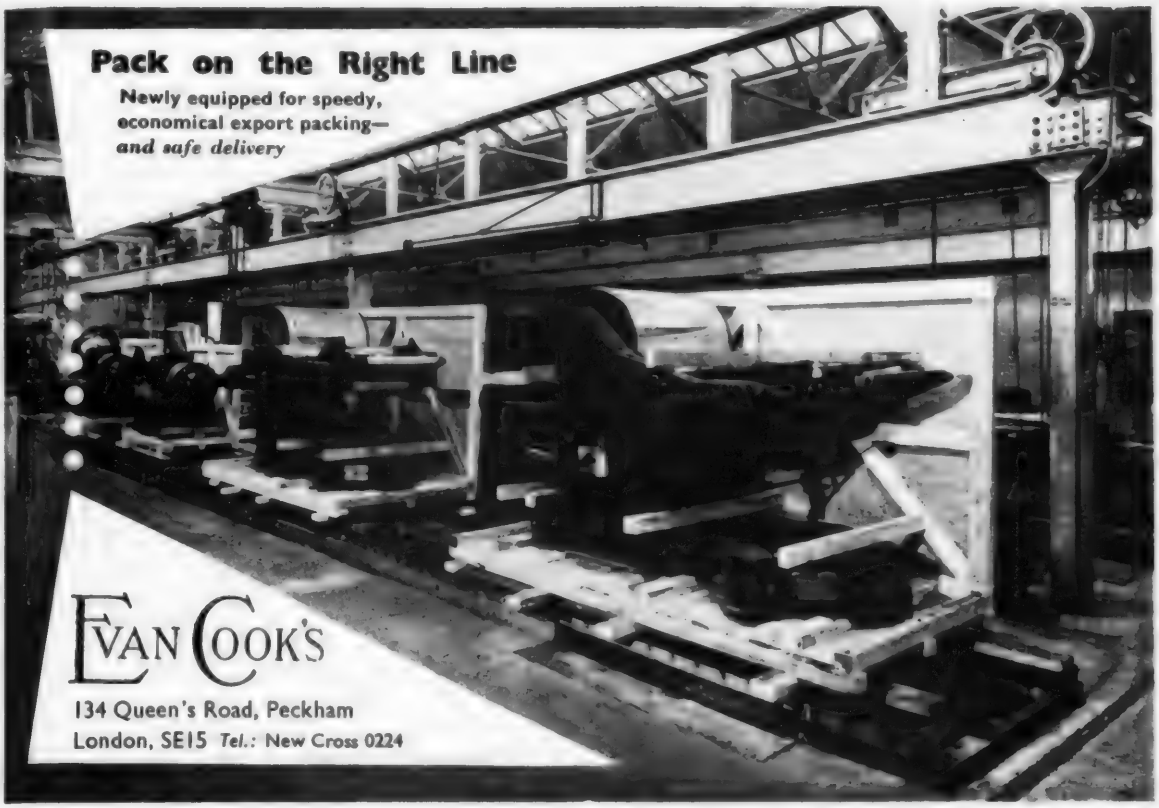
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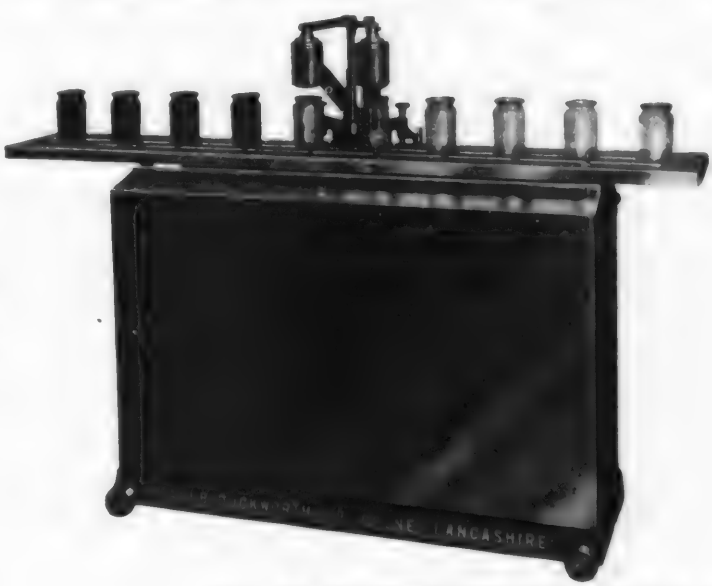

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NATIONAL College of Food Technology. Principal: J. D. Mounfield, M.Sc.Tech., Ph.D., F.R.I.C. B.S.P. Research Fellowship. The Governors invite applications from graduates in chemistry, physics or microbiology for a Research Fellowship of £400 offered by British Soya Products Ltd., for work on Soya or Soya products in relation to the food industry. The Fellowship, which is intended to meet the cost of College fees and maintenance, is for one year in the first instance, but may be extended for a further period.—Forms of application may be obtained from the Registrar, Cranwood Street, City Road, London, E.C.1.

MANAGER to take charge of small fruit canning line at Shrewsbury. Previous experience in fruit purchasing, production and sales essential. Salary and interest.—Box B4668.

ANALYST, experienced Food Industry, required London manufacturer. Start small laboratory. Preferably Univ. or R.Inst.Chem. —Box B4675.

FOOD Technologist required as Factory Manager small factory producing Fish and Vegetable Conserves and Preserves, East London. Room for expansion and development.—Write giving full details to Box B4679.

EXPERIENCED Sauce Maker required for factory production. Married man preferred.—Full details of age, experience, wages required to Box B4681.

ASSISTANT Factory Manager for large Fruit and Vegetable Canning Factory in S.W. England. Must be experienced, possessing initiative, enterprise, and be prepared to work hard. Prospects and pay are excellent. Age not over 40.—Fullest details essential and salary required to Box B4685.

CHOCOLATE Department Chargehand. Must be conversant with all branches of Chocolate Production. Several enrobers and moulding machines installed.—Please give fullest particulars, age, previous experience, positions held, wages received and required.—Box B4692.

FOOD Technologist required by established manufacturers of bakers prepared materials. Applicants should be capable of introducing and controlling new lines and will be required to work without supervision.—Full details of degrees, technical qualifications and experience together with indication of salary required to Box B4689.

MANAGER required for large canning factory in Cyprus. Must be fully experienced in all sections of the business.—Write stating experience, salary required to S. W. Smedley, 113, Wardour Street, London, W.1.

SITUATIONS WANTED

EMINENT Food Technologist, Indian, aged 39, Herculian energy, technically, commercially trained in England, 16 years commercial career earning £900 desires overseas situation. Confident specialist, salary secondary. Quicker, cheaper quality production, waste utilization, bi-products, unexpectedly novel improvements of small canneries, increased output under existing conditions. Solves problems A to Z. Canned, bottled, crytalized, dehydrated, powdered fruits, vegetable, fish, meat, condiments, Indian sweets, chutneys, morabbas. Cooked, ready servable canned food. All descriptions Anglo-American standard. Lay-out, erection, maintenance, repair, expansions.—Please offer. Box B4676.

FACTORY Manager desires change. 25 years experience, thoroughly competent in the manufacture of bakers sundries, control and maintenance of plant. Disciplinarian.—Box B4686.

BISCUIT Production Manager (Indentured apprentice Biscuit Trade with leading manufacturer U.K.) seeks position preferably Commonwealth or U.S.A. At present production Manager biscuit factory in Southern Africa. Full knowledge biscuits, wafers, fillings and all factory routine. 23 years Biscuits.—Box B4687.

MANAGER fully adapted to fruit preserving, canning, pickles sauces, etc., peels, cherries, jellies, mincemeat, puddings, seeking position home or abroad.—Box B4695.

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OLD Established American importers and distributors of consumer size packages of Food Products and Kindred lines will have their representative in London about June 9th for a short visit. He is interested in products acceptable to American markets having competitive advantages and presenting possibilities of large volume profitable business.—Write with details for conference to Walter Benz, c/o Dorchester Hotel, London, W.1.

FOOD Manufacturer has productive capacity available involving use of vacuum ovens, also packing facilities, etc.—Box B4665.

SALES: Canadian Opportunities. Well-established Toronto firm interested in making additional grocery products seeks association with U.K. firm. Outright purchase of formula or royalty basis. Highest references available. Box B4666.

THE Proprietor of Letters Patent No. 575160 relating to a Milk Product and Process of Manufacturing Same is desirous of exploiting the invention by way of licence or sale.—Enquiries should be addressed to Andrews and Byrne, 201, Bank Chambers, 329 High Holborn, London, W.C. 1.

ADDITIONAL Products are required by a prominent manufacturing and marketing organization. The Company has considerable resources and a highly trained and efficient sales force.—Replies should be sent to Box B4677.

ICE CREAM Manufacturers, Leicestershire, with 850 c. ft. low temperature storage and 5 vans available would be interested in coming to an arrangement with any Food Manufacturer or Distributor for utilization or plant and vehicles during winter months.—Box B4678.

TO CANNERS. Merchants with distributive organization covering U.K. desire co-operation with Cannery of good quality fruit and vegetable packs. Agency basis or Advertiser's own brands. Would place orders for special lines in slack periods. Immediate requirements: strawberries, raspberries, loganberries, cherries, possibly garden peas, also products for which Advertisers would supply the fruit.—Write in confidence to Box B4697.

WELL-KNOWN Scottish Pie Makers can offer attractive terms to Agents with own transport. Goods despatched to any part of the country by passenger train. Branded line, goods packed in cardboard cartons, each containing one dozen.—Trade inquiries to : V. C. Pies Ltd., Glasgow. Tel.: Maryhill 1048.

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FULL Steam in five minutes with B. and A. Electrode Boilers, used by British industries for twenty years. No boilerhouse, no flue, no attendant needed. The most compact and convenient steam raisers available, can go beside machines using the steam.—Write for leaflet 125, Bastian and Allen Ltd., Ferndale Terrace, Harrow, Middlesex.

MODERN Warehouse premises with covered loading and garage space situated in the centre of Newcastle Upon Tyne, already handling foodstuffs, have additional warehouse space and facilities for handling and distributing. Arrangements can be made to suit any firm's requirements.—Box 4636.

An organization wishes to dispose of a profitable food manufacturing company, own freehold premises, engaged in making sausages, pies, pastries, etc.

Write for full particulars to:

Box B4664

SECOND-HAND PLANT FOR SALE

600

TEN new twin roll Spray Driers, rolls 40 in. long by 32 in. diam., suitable 60/80 lb. sq. in. w.p., fitted discs, air-cooled scrapers and trough worm discharge conveyors. Main drive by 7 h.p. A.C. motor through reduction gear-box. Two motorized air blowers, motor-driven 1½ in. diam. stainless steel pump, jacketed feed tank approx. 45 in. by 37 in. by 26 in. deep, and motor-driven dresser for dried material, comprising 4 ft. long by 12 in. diam. phosphor bronze mesh covered screen, with spiral distributor to bagging-off outlet.

New Vacuum Drying Oven, mild steel welded construction approx. 7 ft. long by 3 ft. 6 in. wide by 3 ft. 6 in. deep, fitted nine steam-heated shelves to carry thirty-six acid-resisting metal trays, 36 in. long by 16 in. wide by 1½ in. deep. Davit swung door at each end, hand wheel closing. Oven complete with motor-driven horizontal wet vacuum pump, pressure and vacuum gauges and connecting piping.

Three Sifter Mixers by Young, mixing trough 64 in. by 21 in. by 22 in. deep, fitted broken scroll agitator, bottom centre slide discharge. Blending chamber feeds material to positive action brush sifter mounted over mixing chamber. Driven by f. and l. pulleys.

Sifter/Mixer by D. Burr, trough 5 ft. by 2 ft. by 2 ft. 6 in. deep, fitted broken scroll-type agitator.

Sifter/Mixer by Porteus, mixing trough 62 in. long by 27 in. wide by 32 in. deep, fitted scroll-type agitator, bottom gate discharge, brush sifter; drive from vee rope 6 h.p. motor, 415/3/50.

New Rotary Louvre Drier by Dunford and Elliott, 25 ft. long by 7 ft. 6 in. diam., m.s. shell ¼ in. thick, m.s. radial louvres ⅜ in. thick, stainless steel double tangential louvres ¼ in. thick and stainless steel feed cone. Inside of shell and both sides double louvres sprayed 0·002 in. zinc covered by 0·006 in. aluminium. Drum carried on two roller paths and driven through girth gear and pinion from worm gear reduction box and 15 h.p. motor. Complete with inlet and outlet centrifugal fans, exhaust fan metal sprayed, and inside of casing lithcoted.

Totally enclosed Copper Vacuum Evaporating Pan by Kellie, 4 ft. diam. by 2 ft. deep on straight, 2 ft. 2 in. deep hemispherical bottom with 3 in. bore screwed outlet. Bolted on dished cover with 8 in. diam. inlet with cover. Vertical mounted anchor-type agitator in glanded bearing driven by 1 h.p. 380-440/3/50 motor through chain drive and worm gearing giving final speed of 20 r.p.m. Brackets for mounting pan on four legs. Jacket of copper construction with 1 in. steam connections and drain. Jacket tested hydraulically to 100 lb. sq. in. suitable for 50 lb./sq. in. w.p.

Walmer Mark "V" Chocolate Enrober by Walter Denis-Contacts. Water jacketed chocolate bath fitted immersion heater and thermostat, 6 in. wide chain type conveyor in coating section. Air-operated rippler. Cooling section approx. 4 ft. 8 in. long mounted over 6 ft. centres flat belt conveyor fitted 6 in. wide canvas belt covered food grade rubber. Cooling supplied to tunnel from York Shipley self-contained refrigeration unit. Three motors and element suitable 230-240/1/50.

New "Alite Loose Powder Filling Machine, suitable for powders coarse or fine at 16 fills per minute, with range of ½ oz. to 3 lb. Stainless steel hopper with cover having slow motion agitator providing positive fill to filling spiral overdriven by ¼ h.p. 400-440/3/50 motor with starter. Patent clutch and brake mechanism provides positive stop and start ensuring great accuracy. Frame of rigid alloy construction, mild steel parts plated. Fitted table and overflow tray.

Vertical twin-cylinder Ammonia Compressor by L. Sterne, mark 2W.7½, 7½ in. bore by 6 in. stroke, single-stage, single-acting. Capacity 810,000 BTU's elimination per hour when evaporating at 45°F. Driven by 6 h.p. motor 400/3/50.

Vertical twin-cylinder Ammonia Compressor by L. Sterne, single acting cylinders 9 in. bore by 9 in. stroke. Output under standard operating conditions at 350 r.p.m. duty approx. 50 tons refrigeration; 12,000 BTU's per ton; evaporating at 5°F. and condensing at 90°F. 80 h.p. required to drive.

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Bowl Cutter by Barwin, direct electrically driven, 80 lb. capacity, motorized 12½ h.p., 400/3/50. Two available.

New stainless steel Vessels and Storage Tanks, ranging from 8 gall. to 1,000 gall. capacity.

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PHONE 98 Staines. Two 40 gall. steam jac. Mixing Pans 40 lb. w.p. Ditto, without mixing gear. 100 gall. jac. cyl. enc. stainless steel Mixing Pan. 20- 40- and 80-quart Bowl Mixers. (30) "Z" Blade and "Fin" Tilting Mixers jac. and plain up to 36 in. by 30 in. by 26 in. deep. Unused portable electric Stirring Arms 440/3/50. Elec. Boiling Pans 20 and 30 galls. "Gardner" Mixers, 5 ft. 6 in. by 2 ft. by 2 ft. 4 in., 60 in. by 19 in. by 19 in., 40 in. by 19 in. by 19 in. Ditto, 6 ft. by 2 ft. by 2 ft., 400/3/50; Two, ditto, by "Porteus," jac. 6 ft. 3 in. by 2 ft. 3 in. by 2 ft. 7 in., also sifter mixers. Roller conveyor 14 in. wide by 8 in. pitch, also 18 in. wide by 3 in. pitch. 7,000 gall. Glass Lined Tanks. 1,500 gall. Aluminium enc. cyl. Tank. "Lehmann" 4 pot Conche. Edge Runners 2 ft., 3 ft., 4 ft., 5 ft. and 6 ft. diam. Jac. vac. Oven 7 ft. 6 in. by 3 ft., steam 40 w.p. Chamber 30 w.p. Iron, Aluminium, Copper, Stainless and Steel Pans, Pumps, Refiners, Hydros, Ovens, Retorts, Tanks, Boilers, Autoclaves, Disintegrators, Steam and Diesel Engines. Send for lists—Harry H. Gardam and Co. Ltd., Staines.

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SMALL Vacuum Chamber with Air Pump. Two-head Vacuum Bottle Fillers by Roberts with stainless steel contact parts. 80-quart bowl Mixer by Melvin, 4-speeds. Tablet Machines by Colton, Stokes, Wilkinson. Impact Grinding Mill No. 2 size "Perplex."—Welding, Son and Co. (Vauxhall) Limited, Saxone Bdgs., Tarleton St., Liverpool 1.

FOR Sale: B.H.C. Gooseberry Snibber, re-carborundumed and in good condition, with spare jacket and two spare base plates.—Box B4672.

TWO Braithwaite Rapid Jam Boiling Pans, 50-gall. capacity, suitable 70 lb. s.w.p. and fitted 2 in. bottom outlets. Kellie type 4FP Automatic Jam Filling Machine for 1 and 2 lb. jars. B.C.H. Black Currant Striging Machine.—Apply Box 4683.

B.C.H. Rotary Vegetable Dicing Machine in stainless steel, suitable ½ in. cubes capacity 2½/3 tons per hour. Motorized and unused.—Details from Box 4684.

250 and 500 gall. Cylindrical stainless steel Tanks with Agitators; 100 gall. Oblong s.s. Tanks; Alite and Johnston "Lightning" Filling Machines; Pyramid Electric Heat Sealers; Hunter "Emulsor" Emulsifiers and Homogenisers; Gardner Mixers, etc.—Your enquiries invited.—Sorensen Bakery Equipment Ltd., Drake Street, Manchester 15. Tel. CENtral 1353/4. 'Grams: Rahbek.

"BENHIL" Automatic Butter and Margarine Packing Machine complete with motor and starter. Perfect working order.—Sorensen's, Drake Street, Manchester 15.

SECOND-HAND PLANT WANTED

WANTED: Four stainless steel steam jacketed boiling Pans, each approximately 60 gall. actual capacity, 70 lb. per square inch working pressure, non-tilting, bottom emptying, with stirrers, if possible.—Box B4667.

THREE ROLL Granite Refiner 15 in. diam rolls preferably Torrance, for food trade. Must be in good condition.—Box B4674.

BUTTER Weighing and Packaging Machine for ¼ lb. and 1 lb. packets. Must be in good condition.—Details to Box B4673.

REQUIRED: Automatic Syruper for fruit canning.—Send details to Ambassador Food Co. Ltd., 45, Park Lane, London, W.1.

VACUUM Concentrating Plant for continuous evaporation of 500-1,000 lb. per hour required for Fruit Juice.—Box B4688.

VICARS Wafer Spreader required, also modern Wafer Ovens.—Please give fullest details, age, price, and where can be seen. Box B4691.

EXHAUSTER Wanted. Any size.—Write Box B 4694.

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STEAM Sterilizer for 1-lb. jam jars. Motor-driven, 400/440 v, 50, 3-phase. With phosphur bronze plate chains. Can be seen in Cambridgeshire. £280.—Box B4670.

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FOR Sale: Diana large size Dicing Machine, almost new, only worked few hours; spare set of knives and cutting blades. A Peerless Depositor in working order. A Purdy New World Labeller for bottles and cans, in working order. All above machines can be seen running.—Box B4696.

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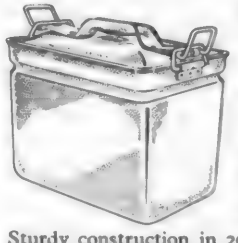

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Have you any dormant or slow selling goods that you wish to clear which are taking up valuable space? We are spot cash buyers for any quantity of the above.

Send details to:
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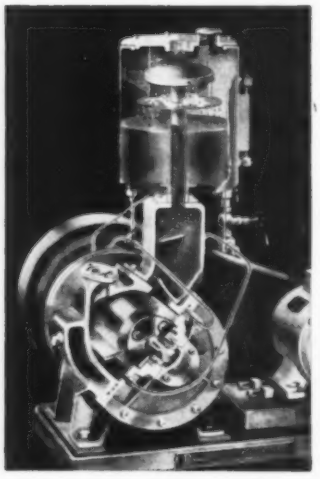

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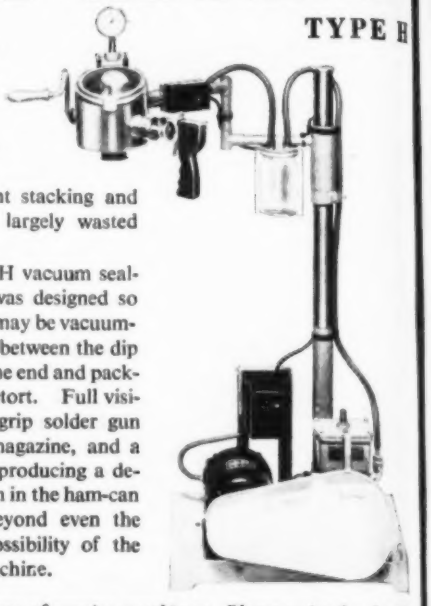
HAM CANNING

TYPE H



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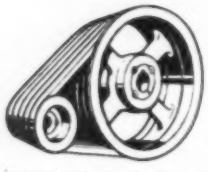
See how FENNER makes mechanical handling easier



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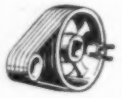

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